Our results demonstrate that NPASc and the compounds on nucleoside triphosphate (nppsc) protect against oxidized LDL particles in vitro.

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Background: Diabetes mellitus (DM) is a heterogeneous group of metabolic disorders which affects over 10% of the world population. The diabetes-induced low-density lipoprotein (ox-LDL) can affect several components of the atherogenic process. Nanodose forms can provide advantages for herbal drugs, including increase of therapeutic index, improvement of stability and controlled delivery.

Objectives: To evaluate the effect of NPASc and the major constituents of the extract (gallic acid, GA; chlorogenic acid, CA; rutin, R) on the levels of lipoperoxidation of ox-LDL particles by AAPH, in vitro.

Materials and methods: LDL was isolated from human serum (n=6). LDL isolated samples were incubated with/without NPASc, GA, CA and R (0.1; 0.25; 0.5 and 1 mg/mL) at 37°C for 30 min. At the end of incubation, the samples were oxidized in the presence of 20 µM AAPH, for 4 h at 37°C. The oxidation was estimated by measuring the thiobarbituric acid reactive substances (TBARS, nmol MDA/mg of protein) [3]. N° of the Ethic Committee (0049.0.243.000-08).

Results: Our results demonstrate that NPASc and the compounds protected LDL particles from the oxidation by AAPH, demonstrating that the known antioxidant activity of S. cumini was maintained. GA and CA showed a significant antioxidant activity, although less than that observed with NPASc; R had a lower effect when compared to other groups. This result confirms the possible antiatherogenic potential of the extract.

Conclusion: NPASc could act to lower the ox-LDL presence in the circulation, reducing the number of proatherogenic potentials thus avoiding the formation of atherosclerotic lesions.

References
Glycemic control affecting the autonomic modulation in type 2 diabetes
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Background: Diabetes Mellitus (DM) is a chronic disease with high morbidity and mortality and one of the most important risk factors for developing cardiovascular disease. DM is associated with cardiac autonomic dysfunction.

Objective: To evaluate if the glycemic control affects cardiac autonomic modulation in individuals with type 2 diabetes.

Materials and methods: We evaluated 49 patients (51.2±7.7 yrs.) with a confirmed diagnosis of diabetes. The subjects were randomized in two groups according to glycated hemoglobin-HbA1c: HbA1c < 7% and HbA1c >7%. The fasting plasma glucose and HbA1c were performed in a specialized laboratory and HR and iRR were recorded for 10 min in the supine position. Statistical analysis included Shapiro-Wilk Test, Mann Whitney Test and Spearman Correlation.

Results: Diabetics with HbA1c>7 presented lower values of all HRV indices compared to diabetics with HbA1c<7 (mean iRR=844.25±117.64 vs 928.47±67.83 ms; STDRR=21.13±12.85 vs 34.92±19.51 ms; RR Tri=5.57±3.07 vs 9.02±5.12; TINN=107.82±65.72 vs 149±50.32, SD2=37.70±19.11 vs 61.94±25.06 ms, except for mean HR (72.45±9.55 vs 65.12±4.91 bpm) where was higher in HbA1c>7 group. HbA1c was negatively correlated with mean iRR (r=-0.28); STDRR(r=-0.33); RRTri (r=-0.35), SD2(r=-0.39) and positively with mean HR (r=0.28). Whereas fasting plasma glucose was negatively correlated with SD2 (r=-0.42); STDRR(r=-0.36); RRTri (r=-0.36) and positively with mean HR (r=0.28). Whereas fasting plasma glucose was negatively correlated with SD2 (r=-0.42); STDRR(r=-0.36); RRTri (r=-0.36) and positively with mean HR (r=0.28).

Conclusion: These findings suggest attenuated cardiac autonomic response in diabetics type 2 with poor metabolic control.

Use of artificial intelligence methods for classifying diabetic patients with polyneuropathy
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Background: Diabetes Mellitus (DM) is a chronic disease with high morbidity and mortality and one of the most important risk factors for developing cardiovascular disease. DM is associated with cardiac autonomic dysfunction.

Objective: To evaluate if the glycemic control affects cardiac autonomic modulation in individuals with type 2 diabetes.

Materials and methods: We evaluated 49 patients (51.2±7.7 yrs.) with a confirmed diagnosis of diabetes. The subjects were randomized in two groups according to glycated hemoglobin-HbA1c: HbA1c < 7% and HbA1c >7%. The fasting plasma glucose and HbA1c were performed in a specialized laboratory and HR and iRR were recorded for 10 min in the supine position. Statistical analysis included Shapiro-Wilk Test, Mann Whitney Test and Spearman Correlation.

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Conclusion: These findings suggest attenuated cardiac autonomic response in diabetics type 2 with poor metabolic control.
Background: Diabetic polyneuropathy (DPN) has an insidious and non-homogeneous installation making it difficult to determine its onset. Therapeutic and preventive actions should target patients depending on their DPN severity status. Methods for supporting the decision making process of classifying patients can improve early health actions.

Objective: Analyze the use of 2 artificial intelligence methods for classifying the DPN severity degree: (a) fuzzy modeling and (b) multiple correspondence analysis (MCA) and Kohonen map.

Materials and methods: Retrospective analysis of 195 patients. The fuzzy model determined a DPN degree score (0-10) by the combination of fuzzy sets derived from clinical variables (sensorial modalities and a set of DPN-related symptoms), using if-then rules to combine the inputs with the output sets (Mamdani process), with membership functions determined by a team of 4 DPN specialists. The MCA method grouped 16 DPN-related categorical variables [sensorial modalities, symptoms, foot inspection characteristics] into micro and macro-clases (groups) after the algorithm learned the grouping pattern of the variables in the patients’ cohort. A Kohonen map was used to better represent the clusters of variables that could identify different DPN severities.

Results: Loss of tactile and vibration perceptions were decisive for classification of DPN severity using the fuzzy system, and its sensitivity and specificity in discriminating patients with and without DPN was very high (ROC=0.965). The MCA and Kohonen map identified 4 macro-classes of variables: (1) DPN absence, (2 and 3) intermediate status (2. characterized by DPN-symptoms, 3- by vibration perception reduction), and (4) severe (absence of vibration perception, foot deformities, amputation or ulcer, absence of tactile perception).

Conclusion: The fuzzy model contributes to the early detection of DPN using typical clinical variables, and although this method strongly relies on the specialist subjectivity, it is very reliable. Software for classifying DPN severity using this Fuzzy model is available and can be easily implemented in any clinical setting as a decision support system [1]. The MCA analysis showed that tactile loss and most of the symptoms do not discriminate between DPN severity status, but the vibration perception was the most discriminative variable. Both methods are useful to help clinical decisions and DPN early detection.

Reference
1. [www.usp.br/labimph/fuzzy].

A5 High prevalence of diabetic neuropathy in academic outpatient league for diabetes at University of Uberaba
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A5

Background: “Diabetic Foot” is the infection, ulceration and/or destruction of the deep tissues associated with neurological abnormalities and various degrees of peripheral vascular disease in the lower limb in diabetic patients.

Objectives: To identify the prevalence of neuropathy and diabetic vasculopathy in patients treated in the outpatient clinic of the League of Diabetes.

Materials and methods: The League of Diabetes adopted screening for diabetic foot, recommended by the Brazilian Society of Diabetes and BrasPEDI-Brazilian Group of Diabetic Foot, through the achievement of a score of neuropathic symptoms and signs (sensitivities tactile, painful, vibration, thermal and Achilles reflex), and clinical evaluation of arteriopathy. The data was carried out by members of the League of Diabetes of the Medical Course, in all patients treated during the year 2014, under supervision. The data were represented as percentages, and analyzed by using SPSS 14.0, through the Chi-square test, with a significance level of 5%. Results: Among the collected data, a total of 73 diabetic patients analyzed, 67.1% had neuropathy, 32.9% arteriopathy of the lower limbs, 9% previous ulcer, 1.4% active ulcer and 1.4% lower limb amputation. For neuropathy, 15.1% presented with diabetic polyneuropathy (DPN) painful, 24.7% painful polyneuropathy with risk of ulceration, 4.1% DPN asymptomatic, 23.3% neuropathic pain and 32.9% without neuropathy. There was association of diabetic neuropathy with: time of diabetes (Chi2=7.789, p=0.020), being more frequent in individuals with 6-15 yrs. of disease; retinopathy (Chi2=3.733, p=0.05); age (Chi2=10.979, p=0.027) was more frequent after 51 years of age; and presence of vasculopathy (Chi2=13.627, p< 0.001) where 95.7% of the individuals with vasculopathy also have neuropathy. The single person with lower limb amputation was also a carrier of diabetic neuropathy.

Conclusion: The thorough examination and the early approach of diabetic patients are essential to enable develop efficient actions and thus, intervene early, in addition to promoting a better prognosis for the patient, raising their quality of life. Diabetic neuropathy is a complication highly prevalent and disabling, and should be diagnosed and treated early in all diabetic patients.

A6 Higher fibre intake is associated with lower blood pressure levels in patients with type 1 diabetes
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A6

Background: The present investigation sought to evaluate the potential association between dietary fiber intake and blood pressure in adult patients with type 1 diabetes (T1D). A cross-sectional study was carried out in 111 outpatients with T1D from Porto Alegre, Brazil. Patients were predominantly male (56%) and white (88%), with a mean age of 40±10 years, diabetes duration of 18±9 years, body mass index (BMI) 24.8±3.85 kg/m2, and HbA1c 9.0±2.0%. After clinical and laboratory evaluation, patients completed 3-day weighed food records. Adequacy was confirmed by estimation of protein intake from urinary urea nitrogen. Patients were stratified into two groups according to adequacy of fibre intake in relation to American Diabetes Association recommendations: below recommended daily intake (<14g fibre/1000 kcal) or at/above recommended intake (≥14g/1000 kcal). Patients in the higher fibre intake group exhibited significantly lower systolic blood pressure (SBP) (115.8±12.2 vs 125.1±25.0 mmHg, p=0.016) and diastolic blood pressure (DBP) (72.9±9.2 vs 78.5±9.3 mmHg, p=0.009), higher energy intake (2164.0±626.0 vs 1632.8±502.0 kcal, p<0.001), and lower BMI (24.4±3.5 vs 26.2±4.8, p=0.044). Linear regression modelling, adjusted for age, energy intake, sodium intake, and BMI, indicated that higher fiber intake was associated with lower SBP and DBP. No significant between-group differences were observed with regard to duration of diabetes, glycemic control, insulin dosage, presence of nephropathy, or retinopathy. We conclude that fibre consumption meeting or exceeding current adequate intake recommendations is associated with lower SBP and DBP in patients with T1D.

A7 Type 1 diabetes induces biomechanical changes in skeletal muscle of Wistar rats?
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Background: Chronic hyperglycaemia caused by diabetes mellitus type 1 is associated with damage, dysfunction and failure of several organs and systems, including the musculoskeletal system [1]. In the installed framework of diabetic insulin deficiency, there is an imbalance between the rates of protein synthesis and degradation, causing a condition called diabetic myopathy [2]. However, there are no reports about investigations of biomechanical characteristics of skeletal muscles in diabetic state.
Objectives: To evaluate the biomechanical properties of the gastrocnemius muscles of rats induced to experimental type 1 diabetes.

Materials and methods: Male Wistar rats were used and were divided into two groups: a) control group, GC (n=11); b) Diabetic Group, GD (n=19). The GD group was induced to diabetes by intraperitoneal administration of streptozotocin. After nine weeks, the gastrocnemius-plantar complex of all groups was collected and forwarded to the mechanical tests, which provided the biomechanical parameters. For statistical analysis Kolmogorov-Smirnov normality test was used, with the Student t test for parametric data and Mann-Whitney test for nonparametric, p < 0.05.

Results: Biomechanical testing GD group exhibited lower values for the variables: maximum power (GC 51.5±19.21; 26.2±9.74 GD; p=0.0001), deformation (GC 17.85±5.75; GD 10.2±3.30; p=0.002), specific strain (GC 41.04±15.89, GD 26.59±8.23, p=0.019), force/width (GC 2.0®±0.37, 1.05±0.39 GD; p < 0.001), power/area (GC 45.58±2.71; GD 4.9±2.21; p=0.003), cross-sectional area (GC 67.49±16.37; 30.13±7.48 GD; p=0.0001). There was no difference in voltage values at full strength and elastic modulus. In clinical and metabolic parameters, experimental diabetes reduced body weight (GC 429.8±32.65g; GD 238.8±26.98g, p < 0.001) and increased blood glucose values when compared to GC group from the first week post induction by the end of the experiment (GC 103.82±16.59/GD 471.30±71.55, p < 0.001).

Conclusion: Most of the evaluated parameters showed a biomechanical disadvantage in the gastrocnemius-plantar complex of animals submitted to Diabetic type 1, making them weaker when subjected to traction.

References

A8

Staging of diabetic tendinopathy in the calcaneal tendon of Wistar rats

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Background: Diabetes Mellitus (DM) causes biomechanical tendon fragility and it may evolve to degeneration and rupture [1]. Although it has been demonstrated the presence of associations between periarticular and musculoskeletal injuries with diabetes [2,3], it has not yet been elucidated from which moment these changes are installed in tendon structure.

Objective: To identify the beginning of the biomechanical changes of diabetic tendinopathy, through the study of staging in the calcaneal tendon of Wistar rats.

Materials and methods: In the 100 days of life, 16 male Wistar rats were induced to DM by intraperitoneal administration of streptozotocin and divided into four groups according to the number of weeks post induction in which the tendons were collected: Group 1, 1st week post induction (1ST WEEK PI), Group 2, 2nd week post induction (2ND WEEK PI), Group 3, 3rd week post induction (3RD WEEK PI) and Group 4, 4th week post induction (4TH WEEK PI). After the trial period, the animals were anesthetized and the left calcaneus tendons were removed for the mechanical traction (4TH WEEK PI). After the trial period, the animals were anesthetized and the left calcaneus tendons were removed for the mechanical traction rehearsal. From the rehearsal the following parameters were evaluated: Elastic Modulus (MPa), Maximum Tension (MPa), Specific Strain (%), Maximum Strength (N), Cross-sectional Area (mm2). For statistical analysis it had been used the ANOVA and Tukey post hoc.

Results: In the 16 animals induced, two have not become diabetic (one rat of the 3RD WEEK PI and one of the 4TH WEEK PI). Maximum strength and maximum tension did not differ between the groups. The cross-sectional area and the specific strain showed reduction in 3RD WEEK PI (p=0.012; p=0.006, respectively) and in the 4TH WEEK PI (p=0.005; 0.008, respectively) compared to the 1ST WEEK PI; specific strain decreased also in the 3RD WEEK PI (p=0.002) and 4TH WEEK PI (p=0.002) compared to 2ND WEEK PI. On the other hand, the elastic modulus was greater in the 3RD WEEK PI (p=0.047) and 4TH WEEK PI (p=0.032) compared to 1ST WEEK PI, besides the increase in the 4TH WEEK PI (p=0.036) compared to 2ND WEEK PI.

Conclusion: The study of staging the calcaneal tendon of rats induced to experimental diabetes identified biomechanical and structural changes of calcaneal tendon from the 3rd week post induction, suggesting that from this phase the tendons become more susceptible to degeneration and rupture when subjected to tension.

References

A9

Behavior of fast and slow myosin in diabetic rats submitted to resistance power exercise

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Background: Myopathy is a recurrent change in diabetic state, characterized by muscle atrophy, weakness and decreased physical capacity (Andersen; Schmitz; Nielsen, 2005). Atrophy in diabetic state is the result of decreased insulin (Dall’ago et al., 2002) which results in the inhibition of myosin synthesis (Vandenburgh et al., 1991), protein responsible for the contractile properties of the muscle which is shaped according to stimulate the muscle is exposed (Iorga; Adamek; Geeves, 2007). In turn, exercise has the ability to reverse the phenotypic changes in mitochondrial muscle proteins caused by insulin deficiency states (Midouani; Tancrede; Nadeau, 1996).

Objective: To evaluate the distribution of fast and slow myosin in the lateral gastrocnemius muscle of rats subjected to a resistance training.

Materials and methods: 22 Wistar rats were used, 60 years old, divided into four groups: Sedentary Control Group-SCG (n=3), Sedentary Diabetic Group-SDG (n=8), Trained Control Group-TCG (n=3), Trained Diabetic Group-TDG (n=8). Induction of diabetes was made by streptozotocin. The protocol of resistance jump exercise took nine weeks (ROGATTO; LUCIANO, 2001). Blood glucose and body weight of the animals from the beginning to the end of the experiment were evaluated. With the end of the exercise protocol, animals’ right side gastrocnemius was collected and sent to immunohistochemistry to quantify the fast and slow myosin.

Results: Animals of all diabetic groups presented lower final body weight (p < 0.05) and blood glucose values greater than 200 mg/dL from induction to the end of the experiment compared to controls. It was observed that the lateral gastrocnemius muscle weights were shown to be reduced in the SDG when compared to SCG (p < 0.05), increased in the TCG when compared to SCG (p < 0.05) and there is no difference between the comparison of the animals of SDG and TDG (p > 0.05). The analysis of fast and slow myosin by immunohistochemistry, it had not demonstrated any difference between groups (p > 0.05).

Conclusion: Diabetic myopathy did not alter the normal distribution of fast and slow myosin in the lateral gastrocnemius muscle, and resistance training had no effect on the distribution of this protein.

A10

Experimental model of mild diabetes: long-term evaluation of glycemic profile and gastric contractility in rats

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Background: Diabetes mellitus is characterized by hyperglycemia resulting from progressive defects in insulin secretion and/or insulin resistance. Diabetes has been associated with several gastrointestinal
A11

K121Q snp of ENPP1 gene is associated with acute rejection in kidney transplantation

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Background: Diabetic kidney disease (DKD) is a common microvascular chronic complication affecting approximately 40% of patients with diabetes mellitus (DM). DKD is one of the major causes of kidney failure in many countries, and is associated with increased health system costs. Kidney transplantation is the treatment of choice for a significant portion of patients with end-stage kidney disease, including DM patients. In this context, acute rejection (AR) is a major post-transplant complication. The use of biomarkers as a tool to predict or detect early pathologic events in kidney transplantation is an attractive and needed strategy. Several studies have evaluated the relevance of genetic variants, including the K121Q polymorphism (rs1044498) in the ENPP1 gene, as predictors for the development of diabetes, DKD and, more recently, AR in kidney transplantation.

Objective: The aim of this study was to evaluate the association of the ENPP1 K121Q polymorphism with acute kidney rejection.

Materials and methods: We performed a retrospective cohort study in 407 white kidney transplant recipients from Southern Brazil. Demographic and clinical data were collected. The ENPP1 K121Q polymorphism was genotyped by TaqMan MGB probes (Life Technologies). Cox regression analysis was used to evaluate overall survival of patients according to the presence of the 121Q allele and AR. This study was approved by the Ethics Committee of Hospital involved, and all subjects signed the informed consent.

Results: Among patients who had AR, 22.3% were K allele carriers (K/K or K/Q) and 42.9% showed the Q/Q genotype (P=0.03). After controlling for potential confounders (age, gender, HLA matching, delayed graft function, blood transfusions and number of pregnancies), the Q/Q genotype remained as an independent predictor of AR compared with the K allele (Hazard Ratio=2.19, 95% CI 1.10-4.35, P=0.025).

Conclusion: The ENPP1 K121Q polymorphism was independently associated with AR in white kidney transplant recipients. If confirmed, this finding may represent a new genetic tool to predict AR.

A12

Shield effect of resistance jumping training on biomechanical parameters in gastrocnemius muscles of diabetic animals

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Background: Chronic hyperglycemia resulting from diabetes mellitus undertakes several body cells through the formation of advanced glycation end products and activation of the polyol pathway (Brownville, 2005), promoting reduction of electrical activity in skeletal muscle and the regenerative capacity of its cells, as well as impaired contractility and increased tissue stiffness. In turn, the amplify muscle work during exercise is able to elicit several essential biochemical reactions for hypertrophy, power gain and enhance muscle function (Andersen et al., 1996, 1997, 2004, 2005).

Objective: To evaluate the biomechanical changes of muscles affected by diabetic state and the effect of resistance training on the biomechanical parameters.

Materials and methods: 65 male Wistar rats were divided into four groups: Sedentary Control (GCS, n=11), Trained Control (GCT, n=14), Sedentary Diabetic (GDS, n=19) and Trained Diabetic (GDT, n=21). GDS and GDT animals were administered with an intraperitoneal dose of streptozotocin to induce diabetes, which was confirmed by measurement of blood glucose fasting on the 3rd and 7th day post induction. GCT and GDT animals were submitted to an overload jumping exercise program of up to 50% body weight, 5 times a week during 9 weeks. At the end of the exercise period, the animals of all groups were anesthetized to collect the gastrocnemius muscles, keeping preserved its proximal and distal insertion into the femur and the distal insertion on the calcaneus for the tensile test of these muscles. Statistical analysis was performed by analysis of variance (ANOVA), using a significance level of 5%.

Results: The mechanical test of the gastrocnemius-plant complex demonstrated in diabetic animals (GDS) lower values in biomechanical parameters: maximum strength (26.5±9.74 vs 39.0±13.3%) post-induction corroborate these motor disorders temporally associated with diabetes.

Conclusions: Moderately elevated blood glucose levels over a long period may be related to the gastrointestinal complications since the gastric contractility is more impaired in the sixth than third month, by a mechanism that may be associated with neuropathy.
Objective: To evaluate serum and urinary levels of PGRN in patients with T2D and chronic kidney disease (CKD) stages 3-5 and compare to patients with T2D and glomerular filtration rate (GFR; CKD-EPI) >60 mL/min and with control individuals without T2D.

Materials and methods: Case-control study. Cases were defined by the presence of T2D and CKD stages 3-5, evaluated by estimated GFR<60 mL/min, and controls were formed by patients with T2D and GFR>60 mL/min (diabetic control group); and by individuals without T2D (non-diabetic control group). PGRN was determined with enzyme-linked immunosorbent assay in blood and urine samples after overnight fasting. The study groups were compared by ANOVA with Tukey or Kruskal-Wallis with Dunn tests for comparison by groups. The Spearman’s correlation coefficient was used. This study was approved by the Ethics Committee of Hospital involved, and all subjects signed the informed consent.

Results: 114 patients were included (25 at case group; 67 at T2D control group and 22 at non-diabetic control group). There were no differences in age, gender, ethnicity and body mass index (BMI) between groups. PGRN was predominantly increased in patients with T2D and CKD stages 3-5, when compared to control groups (cases: 71.97±1.75 vs. T2D control group: 57.39±17.99 and non-diabetic control group: 50.41±12.17 ng/dL; p<0.001). On the other hand, urinary PGRN was decreased in cases compared to control group (cases: 6.62 (6.28-14.62) vs. T2D control group: 16.58 (10.15-24.11); non-diabetic control group: 13.51 (8.38-23.67) ng/dL; p=0.014). There was a positive correlation between serum PGRN and BMI (r=0.246; p=0.008), waist circumference (r=0.236; p=0.012); ultra-sensitive C reactive protein (r=0.372; p<0.001) and interleukin-6 (r=0.350; p<0.001) and a negative correlation with GFR (r=-0.242; p=0.010) in all patients. Urinary PGRN was positively associated to urinary albumin excretion (r=0.256; p=0.007).

Conclusion: PGRN serum levels seems to be a marker of obesity and inflammatory state that is affected by decrease in GFR; while urinary PGRN could be a marker of diabetic kidney disease.

A15
Clinical predictors of cardiac autonomic neuropathy in patients with type 1 diabetes
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Background: Cardiac autonomic neuropathy (CAN) is frequently underdiagnosed. The prevalence of CAN rises with diabetes duration and poor glycemic control. Individuals with DM and CAN have an increased mortality risk, up to 53% five yrs. after diagnosis. Early identification can improve treatment, quality of life and mortality.

Objective: Our aim was to determine the prevalence of CAN in patients with type 1 diabetes (T1D) and its association with clinical characteristics.

Materials and methods: We evaluated 102 patients with T1D (67% female) divided in 2 groups: with and without CAN. Mean age and HbA1c were 34.27±10.96 yrs. and 9.0±2.0%, respectively. CAN was assessed by Poly-Spectrum software using standardized cardiovascular reflex testing and measures of heart rate variability. Statistical significance was set at 5%.

Results: CAN was diagnosed in 39 (38.2%) patients. No statistically significant differences were found in age (34.87±9.71 vs. 33.90±11.74 yrs.; p=0.467), age at diagnosis (15.10±9.16 vs. 17.38±11.29 yrs.; p=0.495) and HbA1c (9.26%±2.04 vs. 8.84%±2.07; p=0.144) between groups. Hypertension and dyslipidemia were seen more frequently in patients with CAN (61.5 vs. 19%; p=0.001 and 51.3 vs. 22.2%; p=0.002, respectively). Patients with CAN had higher total cholesterol (p=0.009) and triglycerides (p=0.004). Patients with CAN complained more often of post-prandial sweating and orthostatic hypotension (35.9 vs. 14.3%; p=0.011 and 51.3 vs. 30.2%; p=0.033, respectively). Other symptoms questioned were similar between groups, including hypoglycemia (p=0.7). CAN showed a rising prevalence as complication severity increased. For retinopathy, the frequency of CAN was 54.2%, 60% and 78% in those with nonproliferative, proliferative, unilateral and bilateral blindness, respectively (p<0.001). Regarding nephropathy, CAN was present in 41.2%, 75%, 88.9% and 100% in patients with microalbuminuria, macroalbuminuria, chronic kidney disease, hemodialysis and kidney transplant, respectively (p=0.001). Diabetic neuropathy, motor sensory neuropathy/symmetric polyneuropathy and more than one neuropathy were seen in 72% and 100% of patients with CAN, respectively (p=0.001).

Conclusions: These results support an association of increased CAN prevalence and chronic complications and their severity. CAN was also associated with hypertension and dyslipidemia, but with few autonomic symptoms (post-prandial sweating and orthostatic hypotension). As expected, HbA1c had no relevance in CAN occurrence.

A16
Effects of monochromatic infrared energy in patients with diabetic peripheral neuropathy: a meta-analysis of randomized clinical trials
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Background: Monochromatic infrared energy (MIRE), delivered through light-emitting diodes, has been used as a non-pharmacological complementary strategy to improve plantar sensitivity and pain symptoms in patients with diabetic peripheral neuropathy (DPN), but conflicting results [1,2] have been reported.

Objective: Summarize the effect of MIRE in plantar sensitivity and neuropathic pain in patients with DPN trough a systematic review of randomized clinical trials.
Materials and methods: MEDLINE, EMBASE, Cochrane Central and Google Scholar were searched for studies published up to May 2015. Two independent reviewers assessed study eligibility based on predefined criteria and performed data extraction. Results of plantar sensitivity were in standard mean difference, and pain were in mean difference, with 95% confidence intervals. Statistical heterogeneity was assessed by Cochran’s Q test and inconsistency I² test. A p value ≤ 0.05 was statistically significant. Meta-analysis was performed on RevMan 5.3. Results: From 2330 abstracts, six studies met the eligibility criteria and were included in the systematic review (304 patients; 606 feet) (Figure 1).

Figure 1(abstract A15) Clinical predictors of cardiac autonomic neuropathy in patients with type 1 diabetes. Values are shown as frequency (%) and mean (standard deviation)
Participants were adult individuals with type 1 or 2 diabetes and DPN. MIRE was applied for at least thrice a week for 30 min/day in ankles and plantar aspect of feet. Follow-up ranged from two to 12 weeks. Comparison group (placebo or control) did not receive MIRE. Overall effect of MIRE in plantar sensitivity was a statistically significant reduction in insensitive plantar areas to the 5.07 Semmes-Weinstein monofilament [–0.54;–1.05 to –0.03]; I²: 85%). Heterogeneity decreased after a sensitivity analysis including only placebo studies; effect size remained statistically significant favoring MIRE [–0.26;–0.50 to –0.03]; I²: 23%). Overall pain symptoms decreased but not differed between MIRE and comparison groups [–0.88;–3.11 to 1.36]; I²: 99%). After a sensitivity analysis including only placebo studies, heterogeneity decreased but a statistically significant placebo effect was found in pain relief [0.48(0.30 to 0.66); I²: 0%] (Figure 2).

Conclusion: MIRE slightly improves plantar sensitivity in DPN with moderate confidence; further well-designed studies were likely to change effect size and reduce heterogeneity.

References

A17
Charcot osteoarthropathy in conservative treatment: clinical and functional results
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A17

Background: Charcot neuro-osteoarthropathy (CA) is a rare complication of neuropathy that affects patients who have lost protective sensation, has multiple etiologies and diabetes mellitus is the most prevalent. The CA is progressive degeneration of the affected joints and it is known that, in situations where there is not an adequate intervention, can install the complete destruction of the affected joints, as well as irreversible deformations, which lead to the development of ulcers and high index of amputation. In the consolidation phase, surgical treatment is usually indicated; however, the procedure is not always possible due to clinical limitations of patients, or even surgical difficulty itself. The suropodalic orthosis adapted to the patient may present as an alternative therapy. The suropodalic orthosis may allow the maintenance function and walking ability.

Objectives: To describe sample of patients with Charcot osteoarthropathy of a tertiary hospital in conservative therapy using suropodalic orthosis, evaluating as the main question the walking ability and accomplishment of daily tasks, and the occurrence of ulcer and/or infection.

Methods: This is a prospective study, evaluated for the period of 5 years, 14 patients with CA, E III, SC, using suropodalic orthosis. Walking ability and accomplishment of daily tasks were routine annotated using as a tool of the domain 3 of the SF-36 (Medical Outcomes Study 36-item Short-Form Health Survey), as well as occurrence of ulcer and/or infection.

Results: We evaluated 14 patients, 57% were women and 43% men, mean age 57.2 years, mean glycosylated hemoglobin 8.2%, with standard deviation of 2.69%. Diabetes average time of 10 years. In the evaluation of items related to function, walking and performing daily activities, we find satisfactory results (Figure 1). During the following five years, none of these patients had an episode of ulcer/or infection in the foot affected.

Conclusion: Our data suggest that even in advanced stages of AC, when possible, the continued use of suropodalic orthosis may allow the maintenance function and walking ability.

A18
Risk factors for ulceration and amputation in patients with diabetic foot at risk: results form a tertiary care center
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A18

Background: Ulceration and amputation are severe complications of diabetes, leading to great morbidity and mortality. Of all lower limb amputations, about 50% are performed in these patients (1). In their lifetime, diabetics have a chance as high as 25% to develop a foot ulcer (2). After an amputation, mortality rates ranges from 13% to 40% at 1 year, 35% to 65% at 3 yrs., and 39% to 80% at 5 yrs. (3). The aim of this study was to assess the main risk factors of ulceration and amputation in patients with type 1 and type 2 diabetes.

Methods and methods: A cross-sectional study was conducted in a tertiary hospital. Data was collected on the patients’ first attendance in the neuropathic and diabetic foot unit, between June 2012 and September 2014. Statistical significance was set at 5%.

Results: A total of 177 patients were evaluated. Ulceration and amputation were significantly more frequent in men (70.2% of all ulcerated patients and 76.9% of all amputees; p < 0.001). Hypertension was also a risk factor.
for amputation, present in 74.5% of amputated patients (p=0.034). In ulcerated patients, glycate hemoglobin was higher than in non-ulcerated patients (9.2±2% vs 8.35±1.99%; p=0.003). The independent risk factors for ulceration and amputation were neuropathic and neuro-ischemic foot at risk classification (OR 4.41; CI 1.83–10.65; p=0.001 and OR 1.21; CI 2.07–60.47; p=0.005, respectively), dyslipidemia increased (OR 9.2; CI 1.64–51.58; p=0.012 and OR 5.68; CI 1.21–26.46; p=0.027, respectively) and microalbuminuria (OR 1.00; CI 1.00–1.00; p=0.011 and OR 1.005; CI 1.001–1.008; p<0.001, respectively). There were no statistically significant differences between risk of ulcer or amputation and ethnicity,
Background: Diabetic foot complications are the most serious and costly problem of Diabetes Mellitus affecting substantially the quality of life of these patients. People with diabetic foot ulcers experience severe restrictions on daily life as a result of the ulcer. They face social isolation due to reduced mobility, they require frequent clinical treatment and constant caution to ensure that effective care is taken of the feet.

Objective: The primary aim of this study was to compare the patient perceptions of their quality of life in two moments of the timeline of the diabetic vascular disease: pre revascularization surgery period and post amputation.

Materials and methods: An exploratory cross-sectional study was done in a sample of 28 patients with peripheral vascular complications of diabetes, divided in two groups of 14 individuals. One group consisted of outclinic patients with lower limb amputation (transtibial or transfemoral level) for at least six months. Another group consisted of hospitalized patients with critical ischemia of the lower limbs, waiting for revascularization procedures. The Portuguese version of the Medical Outcomes Study 36 -Item Short Form (SF-36) and the Brazilian version of the Problems Areas in Diabetes Scale (B-PAID) questionnaires were used.

Results: Patients who had been through amputation had significant (p<0.05) lower impairment in the total score (46.48±24.91; 30.74±11.0), vitality (80.00±29.70; 47.50±18.05), role emotional (50.00±44.54; 31.25±29.60) and mental health (61.14±27.10; 36.86±18.17) domains than pre revascularized patients. The statistical difference between groups...
regarding the B-PAID questionnaire score was significant (p<0.01), with the best results showed by patients with amputation (44.57±18.23; 70.93 ±19.72).

Conclusion: Those findings demonstrate that diabetic patients with critical ischemia in the lower limbs had worst quality of life scores than those with amputation. The postponing of an amputation must be well judged when a critical ischemia of the lower limbs is seriously impairing the patient's quality of life.

Epidemiology and outcomes of 655 diabetic foot patients in a Brazilian university hospital
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A20

Background: Diabetic foot infections are a feared diabetic complication once it is associated to high amputation rates. The vascular surgeon plays a special role assessing and treating macrovascular impairments in order to avoid major amputations and death.

Objective: Assessment of the epidemiological data and outcomes – rates of mortality, hospital readmissions and limb salvage – of patients with diabetic foot infections treated in a tertiary university hospital in Brazil.

Materials and methods: From January/2007 to December/2012, 655 patients with diabetic foot infections or ulcers were admitted at the vascular surgery unit. Retrospective medical records were reviewed and analyzed. The predictors for lower limb amputation and death were determined using the conditional logistic regression model analysis.

Results: Sixty seven percent (442) were males; the age ranged from 21 to 102 years (median 63 years). Arterial ischemia was present in 28% of the patients. Among these diabetic patients 73% had hypertension and 30% were active smokers. The in-hospital mortality rate was 12%, and there was no statistically difference between patients with ischemic and non-ischemic lesions (P=0.16). Of the 576 patients alive, 61% were not readmitted, 21%
were readmitted once and 18% were readmitted twice or more times. The minor amputation rate was 48% while major amputations were performed in 21% of the subjects (28% below the knee amputation and 72% above the knee amputation). The major amputation free survival rate was 72%. After discharge 47% of the patients required special home-care for dressings and for parenteral drug administration. Independent risk factor for amputation were age (OR: 1.02; 95%CI: 1.001-1.035; P=0.041) and arterial ischemia (OR 2.20; 95%CI 1.46-3.31; P<0.0001). Independent risk factors for death were age (OR 1.06; 95%CI 1.03 – 1.08; P<0.01) and major amputations (OR 2.38; 95% CI 1.41 – 3.99; P<0.01).

Conclusion: Diabetic foot is a severe condition with high mortality and amputation rates. Conditions associated with limb loss were age and ischemia. The independent risk factors for death were age and major amputation.

A21

Functional status after major amputation in diabetic foot patients from a tertiary hospital

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Background: The impact of global diabetes burden is evidenced by the growing morbidity and mortality rates, and by permanent disabilities such as blindness, diabetic retinopathy, end-stage renal failure and lower extremity amputations.

Objective: The purpose of this study was to verify functional status of diabetic foot patients submitted to lower limb major amputation after the discharge of a university hospital, reference in vascular surgery. A cohort of 31 diabetic foot patients was identified from the electronic medical records. Data were retrospectively collected from each patients chart including age, gender, peripheral arterial disease, level of amputation and number of readmissions. Patients were contacted by phone. A questionnaire investigated the survival, functional and ambulatory status: pros thesis use, reason for non-implantation of prosthetics, other hospitalization and amputation, mobility, self-performance of activities of daily living such as dressing and personal hygiene.

Results: The mean age of patients at the time of surgery was 65.23 yrs. (SD 7.01). Patients with Type 1 diabetes (T1D) have an increased risk of mortality in cohort of T1D followed at UFRJ, Rio de Janeiro, Brazil.

Subclinical hypothyroidism and high TSH levels of TSH have been associated with an increased albumin excretion in euthyroid T1D patients with adequate glycemic control and at least 10 yrs. of disease.

Materials and methods: This observational, retrospective study included patients with T1D for ≥ 10 yrs. without a known previous thyroid disease and a TSH measurement within the last year. Clinical and epidemiological data were obtained in an interview and the review of the medical charts. Patients were divided into two groups according to TSH levels: ≤2.5 mU/L and >2.5 mU/L. Patients with TSH < 0.4 or ≥10 mU/L were excluded.

Results: We included 118 individuals with a mean age of 27.84±9.25 yrs., mean disease duration of 17.11±7.13 yrs., mean HbA1c over the yrs. of 8.55±1.6% and mean current HbA1c of 8.32±1.64%. Thirty six patients (30.5%) had TSH>2.5 μU/mL. There were no differences between groups established according to the TSH levels and HbA1c in the first 5 yrs. of disease (p=0.138), mean HbA1c over the years. (p=0.878) and current HbA1c (p=0.834). The prevalence of diabetic retinopathy was lower in those with TSH <2.5 μU/mL than others (2.5% vs. 23.5%; p=0.024), as well as the prevalence of increased albumin excretion (7.3% vs. 50%; p<0.0001), however analyzing only patients with mean HbA1c over yrs. below 8.0%, this difference was not observed. The prevalence of diabetic neuropathy (peripheral and autonomic) were similar in both groups (p=0.41 and 0.103, respectively).

Conclusion: TSH levels ≥2.5 μU/L are associated with a higher risk of diabetic retinopathy and increased albumin excretion in individuals with T1D with long duration of the disease. Further studies are necessary to identify if levothyroxine use might reduce the risk of complications in these individuals.

A22

High normal TSH is associated with retinopathy and increased albumin excretion in euthyroid type 1 diabetic patients

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Background: Patients with Type 1 diabetes (T1D) have an increased risk of autoimmune diseases, especially thyroid disease, and untreated thyroid disease may interfere in the insulin sensitivity and glycemic control. Subclinical hypothyroidism and high levels of TSH have been associated with high risk of cardiovascular disease and chronic complications in type 2 diabetic (T2D) patients. TSH levels have also been linked to diabetic retinopathy and renal dysfunction in patients with T1D.

Aim: The objective of this study was to evaluate the relationship between TSH levels and the prevalence of microvascular complications in euthyroid T1D patients with adequate glycemic control and at least 10 yrs. of disease.

Materials and methods: This observational, retrospective study included patients with T1D for ≥ 10 yrs. without a known previous thyroid disease and a TSH measurement within the last year. Clinical and epidemiological data were obtained in an interview and the review of the medical charts. Patients were divided into two groups according to TSH levels: ≤2.5 mU/L and >2.5 mU/L. Patients with TSH < 0.4 or ≥10 mU/L were excluded.

Results: We included 118 individuals with a mean age of 27.84±9.25 yrs., mean disease duration of 17.11±7.13 yrs., mean HbA1c over the yrs. of 8.55±1.6% and mean current HbA1c of 8.32±1.64%. Thirty six patients (30.5%) had TSH>2.5 μU/mL. There were no differences between groups established according to the TSH levels and HbA1c in the first 5 yrs. of disease (p=0.138), mean HbA1c over the years. (p=0.878) and current HbA1c (p=0.834). The prevalence of diabetic retinopathy was lower in those with TSH <2.5 μU/mL than others (2.5% vs. 23.5%; p=0.024), as well as the prevalence of increased albumin excretion (7.3% vs. 50%; p<0.0001), however analyzing only patients with mean HbA1c over yrs. below 8.0%, this difference was not observed. The prevalence of diabetic neuropathy (peripheral and autonomic) were similar in both groups (p=0.41 and 0.103, respectively).

Conclusion: TSH levels ≥2.5 μU/L are associated with a higher risk of diabetic retinopathy and increased albumin excretion in individuals with T1D with long duration of the disease. Further studies are necessary to identify if levothyroxine use might reduce the risk of complications in these individuals.
Conclusion: Our study showed that T1D patients had died at an early age and the causes of mortality were mainly from diabetes-related chronic complications.

**A24**

**Screening for assessment of diabetic peripheral neuropathy in Diamantina, Minas Gerais-Brazil**

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**Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A24**

**Background:** Neuropathy is a common complication of type 1 and type 2 diabetes mellitus (DM) that contributes to both mortality and morbidity among the diabetic population leading to substantial physical, physiological and financial burden for the patients and community at large. Diabetic foot complications are a global problem with increasing incidence of DM worldwide.

**Objectives:** The aim of the study was to evaluate the sensitivity level of the feet, lower limb strength and balance (static and dynamic) in patients with diabetes regarding the presence or not of peripheral neuropathy.

**Materials and methods:** This study was carried out in the Diamantina, Minas Gerais-Brazil. This is a prospective study conducted in 27 volunteers, 5 diagnosed as type 1 diabetes (DM1), 10 as type 2 diabetes (DM2). All volunteers underwent a protocol with detailed clinical examination, glycemic index, muscle strength, balance and dynamic mobility, and sensitivity of the feet using the Michigan Neuropathy Screening Instrument and Semmes-Weinstein Monofilaments. After collecting data, Results of both groups were compared with their controls.

**Results:** DM1 and DM2 groups had higher levels of blood glucose compared with the respective control (p<0.01; p<0.05, respectively). DM1 group had weight and body-mass index (BMI) lower than DM1C group (p<0.01). The sensitivity studied showed a distribution with predominance of purple monofilament in DM2 and DM2C groups in different points of the feet. All groups showed changes in muscle strength. However, the groups of subjects with diabetes had a slight deficit of strength in relation to the controls. Only DM2 and DM2C groups presented score indicative of peripheral neuropathy in Michigan Neuropathy Screening Instrument.

**Conclusion:** In the present study both DM1 and DM2 groups showed changes in tests and were more evident in DM2 group. However, this finding is not sufficient to indicate the presence of peripheral neuropathy in this population. The duration of diabetes is a factor that suggests severity of symptomatic subjects, for this reason it is interesting to assess and correlate it with other variables in future studies.

**Materials and methods:** We performed a retrospective analysis of the records of the patients with diagnostic criteria of MS hospitalized in IEDE between April/2013 and June/2015 and of one patient followed at the outpatient clinic.

**Results:** Eight patients with diagnosis of MS were identified and 50% of them were female. The medium age at presentation of MS was 12 (10-14) yrs., with a medium interval between DM1 diagnosis and MS criteria of 6 (3-12) yrs. The medium time of diagnosis of DM1 was 8.12 (5-12) yrs. All the patients were on basal insulin (4 with long-acting insulin analogs and 4 with NPH insulin) and rapid-acting insulin analogs bolus and the medium daily insulin dose was 0.93 (0.61-1.15) U/kg. All had a previous history of poor glycemic control with medium glycated hemoglobin of 11.3 (8.7-14.2%) before the diagnosis of MS. Increase of hepatic enzymes and hepatomegaly at physical examination (4 confirmed by ultrasonography) were present in all the patients. None of the patients had cuchingoid features or diabetic microvascular complications. Five patients presented diagnosis of short stature, but growth's deceleration was found in all of them. All the patients presented dyslipidemia. Just 3 patients were adherent to diabetes management and only one of them has never been hospitalized for diabetic ketoacidosis.

**Conclusion:** Mauriac’s syndrome is an uncommon condition resulting from poorly controlled DM1 in childhood and adolescence. However, staying alert to the existence of MS is fundamental, since most clinical features are reversible with improved glycemic control. Special attention and a multidisciplinary team are necessary to monitor these patients in order to help treatment compliance and prevent complications in the future.

**A26**

**Main risk factors for diabetic foot**

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A26

**Background:** Diabetic foot is a chronic complication of diabetes mellitus (DM) that may manifest as neuropathy, vasculopathy, osteoarticular involvement and infection. Foot injuries are among the most serious and costly complications of diabetes. Foot care programs can reduce the occurrence of injuries by 50%.

**Objectives:** Assess the determinant risk factors of diabetic foot in DM patients assisted in the public health service of Chapecó-SC.

**Materials and methods:** Descriptive, cross-sectional study evaluated 130 diabetics type 1 and 2, over 18 yrs. old. The survey instrument adapted from “Rastreamento e avaliação precoce dos fatores de risco e prevenção do pé diabético”, developed by SBDOF and Grupo de Pés Diabeticos do Brasil, was applied to analyze neuropathic symptoms, feet clinical inspection, loss of protective sensation (LPS), peripheral arterial disease (PAD), ulcers, amputation and risk classification – 0: without LPS and PAD; 1: presence of LPS and/or ulcers; 2: PAD=0, LPS, 3: previous ulcers and/or amputation.

**Results:** Samples evaluated showed 99.2% of DM patients had DM2, 70% female, age 64.68±11.45 yrs. old, disease duration 10.4±8.5 yrs. and 17.7% of insulin users. Mean HbA1c was 8.02±2.19%. Neuropathic symptoms were reported by 75.3% of patients, predominantly burning, numbness or tingling. The most prevalent clinical findings were dry skin, cracks or fissures (76.2%), ungual mycosis (33.8%) and calluses (31.5%). Inappropriate footwear use was seen in 74.6% of subjects. LPS was found in 28.5%, and 73.3% of these had HbA1c>7% (p=0.069). LPS was detected in 80% of patients who had previous ulcers (p=0.023). The majority (75%) of patients with involvement of thin fibers (burning or pain and/or thermal sensitivity decreased) had diabetes for less than 10 yrs., which is shown as a premature injury. While in 52.1% of patients with damage in thin+thick fibers (thin fiber=irregular monofilament exam and/or decreased vibratory sensation) had diabetes for less than 10 yrs., which is shown as a premature injury. While in 52.1% of patients with damage in thin+thick fibers (thin fiber=irregular monofilament exam and/or decreased vibratory sensation) had more than 10 yrs. of disease (p=0.031). PAD signals were observed in 20% of the sample. Regarding the risk classification, 57.7% were classified as risk 0, 20.8% risk 1, 16.9% risk 2 and 4.6% risk 3.

**Conclusion:** Data confirms the impact of timing in diabetes evolution and uncontrolled glycaemia, also shows the onset of thin fibers signs of neuropathy occurs early before the LPS, serving as a warning for diagnosis and treatment in this evolution phase of peripheral neuropathy, which is the main risk factor for diabetic foot.
**A27**
The interrelationship between metabolic memory, glycemic variability, oxidative stress and microalbuminuria in type 1 diabetes
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Diabetology & Metabolic Syndrome 2015; 7(Suppl 1):A27

**Background:** Several studies have discussed the role of metabolic memory (MM) and glycemic variability (GV) in the development of chronic diabetes complications (CDC), possibly by triggering oxidative stress (OS). However, the Results are conflicting and there are few studies in type 1 diabetes (T1D) patients.

**Aims:** It was to investigate the relationship between metabolic memory, glycemic variability, oxidative stress and microalbuminuria (MA) in T1D.

**Patients and materials and methods:** Seventh-six T1D without clinical CDC and 22 healthy individuals were studied. MM was evaluated by glycated hemoglobin (HbA1c) of the last 3 yrs. GV: “short term” (STGV) by standard deviation (SD) of continuous glucose monitoring system (CGMS) over 3 consecutive days and “long term” (LTGV) by SD of the last 3 months on Accu Chek 360® diabetes management system. OS biomarkers (OSB) were estimated from 8 h overnight urinary excretion rates of 8-isoprostaglandin-F2α (ELISA, ALPCO-US), from plasma nitric oxide (NO) by chemiluminescence; plasma thiobarbituric acid reactive substances (TBARS) and erythrocytes reduced/oxidized glutathione (GSH/GSSH) by colorimetric assay (EnzyChrom GSH/GSSG Assay- EGTT-100). HbA1c (HPLC; nv: 4.0-5.5%) and MA (munoturbidimetric assay; nv <15 µg/min).

**Results:** T1D (age: 23.6±6.8 yrs; disease duration: 13.0±6.0 yrs., BMI: 23.8±3.6 Kg/m2 and HbA1c (mean±SD) of the last 3 yrs: 8.9±1.5%) and controls (age: 25.8±3.9 yrs, HbA1c 5.4±0.3% and BMI: 22.1±2.8 Kg/m2 were studied. STGV was higher in T1D than in controls (74.5±19.7 vs 10.8 ±1.7 mg/dL; p<0.001) and had association with LTGV (rS: 0.36; p: 0.003), age (rS: -0.23; p: 0.037) and HbA1c (p: 0.001). LTGV (103±26.1 mg/dL) in T1D was associated with BMI (rS: 0.24; p: 0.047). NO was higher in T1D than controls: 115±104.1 vs 63.8±13.6 µM (p: 0.001) and in T1D was correlated with LTGV (rS: 0.28; p: 0.036), MA (rS: 0.26; p: 0.049) and the HbA1c (mean of the last year; rS: 0.27; p: 0.042). TBARS was correlated to MA (rS: 0.32; p: 0.015). The GSH/GSSH and the 8-iso-PGF-2α didn’t show any correlation with the parameters studied.

**Conclusion:** The OSB have a heterogeneous behavior in T1D. NO is higher in young adult with T1D and it was related with MM, LTGV and endothelial dysfunction. So these variables should be included on the objectives of T1D good glycemic control.

**A28**
Prevalence and profile of diabetes kidney disease according to different diagnostic criteria in type 2 diabetes mellitus patients
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**Background:** Diabetes kidney disease (DKD) is the worldwide leading cause of end-stage renal disease. Diagnostic criteria have been recently revised.

**Objective:** The aim of this study was to evaluate the prevalence and clinical profile of type 2 DM patients according to the employed definition of DKD: previous diagnostic criteria as compared to the present one.

**Materials and methods:** 566 type 2 DM outpatients from the Endocrine Unit ambulatory were included. DKD was defined by the presence of elevated urinary albumin excretion alone (UAE; >14 mg/g) -previous definition- or by the presence of elevated UAE and/or reduced (<60 ml/min/1.73 m2) glomerular filtration rate (GFR) -present definition.-

**Results:** Mean age was 63±11 yrs., 37% men, 86% white, 10% smokers, DM duration 16 years. When evaluated by elevated UAE only, 50% of the patients presented DKD. Table 1 shows the profile of these patients (Fig 1). When defined by both UAE and GFR, 57% presented DKD, and Table 2 shows the profile of these patients (Fig 2).

**Conclusion:** DKD cases would be missed if only UAE is taken into account.

**A29**
The impact of sustained hyperglycemia, metabolic memory and hba1c variability in the development of chronic complications in patients with type 1 diabetes
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**Background:** Sustained hyperglycaemia has been linked to the development of chronic complications of type 1 diabetes (T1D) in most populations, especially if it occurs in the first few yrs. of the disease. However, this has been poorly studied in the Brazilian multi-ethnic population.

**Objectives:** To assess if there is an association between the development of chronic complications (retinopathy-DN, nephropathy-DN, peripheral neuropathy- PN and cardiac autonomic neuropathy-CAN) in patients with T1D and 1) the mean glycated Haemoglobin during their follow-up since diabetes onset (mHbA1c); 2) the standard deviation (SD) of HbA1c over this period, 3) the HbA1c in the first 3 yrs. of disease (1st 3 yr) and 4) the current HbA1c.

**Materials and methods:** This retrospective study included patients with T1D ≥5 yrs. that were followed in a specialized center. Epidemiological, clinical and laboratory data were obtained by reviewing the medical charts. mHbA1c, HbA1c in the 1st 3 yr of T1D and SD of HbA1c were calculated. DR was evaluated by ophthalmoscopy. Increased urinary albuminexcretion (IUAE) was defined according to the ADA criteria. CAN was diagnosed through a Questionnaire and Variability of heart rate tests. PN was defined by Neuropathy Symptoms Score and Neuropathy Disability Scores.

**Results:** 199 patients were assessed (54.7% women) with mean age and T1D duration of 27.9±9.7, 17.1±7.3 yrs., respectively. Their mean mHbA1c was 8.38±1.58%. DR, IUAE, PN and CAN were seen in 10.8% (12/111), 17.7% (33/188), PN in 35% (23/64) and CAN in 31.3% (33/107). Patients with IUAE had higher mHbA1c levels than others (8.95±1.53 vs. 7.99±1.18; p=0.010). mHbA1c also differed between those with PN and others (9.12±1.82 vs. 7.65±0.93; p=0.001). Although there was no association between mHbA1c and DR, the mean HbA1c in the last 10 yrs. was higher in those with DR than others (7.98±1.25 vs. 9.68±1.85; p=0.001). The SD of HbA1c was also higher in those with DR and CAN than those without these complications (p=0.004 and p=0.003, respectively). The HbA1c 1st 3yr. was higher in patients with DR (12.41±5.06 vs. 7.33±0.86; p=0.001) and in those with DN (9.35±0.45 vs. 7.71±0.81; p=0.036) than others. Current HbA1c (8.35±1.56) was not associated with either of these complications.

**Conclusions:** Sustained hyperglycaemia, especially in the first years of the disease, and HbA1c variability over time have been linked to the development of chronic complications in our population.

**A30**
The association of dyslipidemia and peripheral diabetic neuropathy: the influence of urea
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**Background:** Peripheral neuropathy is a common complication of diabetes mellitus, usually manifesting as axonal sensitive-motor symmetric polyneuropathy. In the EURODIAB study, total cholesterol and triglycerides were associated to peripheral diabetic neuropathy (PDN).
Aims: Evaluate the influence of cholesterol, triglycerides and statin use on a clinical score of peripheral neuropathy in patients with diabetes mellitus.

Methodology: Ninety consecutive patients at a university hospital in Manaus, Amazonas were included in this study. Eighty-six (95.6%) had type 2 diabetes, 66.7% were female, mean age was 56.2±12.8 yrs.-old and mean time of diabetes diagnosis was 11.5±9.5 yrs. They were evaluated using Michigan Neuropathy Screening Instrument (MNSI) and the clinical component of the Michigan Diabetic Neuropathy Score (MDNS). This component evaluates vibratory, painful and tactile sensitivities. Subjects who scored 7 or more on this component of the MDNS were considered as having PDN (Feldman et al., 1994). MNSI and MDNS clinical component scores were analyzed according to lipid profile and statin use.

Results: According to MDNS clinical component, 20 (22.2%) patients had PDN. These patients, compared to those patients who did not have PDN, had more time of diabetes diagnosis (16.2±11.3 vs. 10.2±8.6 yrs.), more stroke (15 vs. 3%), more insulin use (75.0 vs. 48.6%) and higher serum urea levels (44.4±17.6 vs. 36.9±16.8 mg/dL). There were no differences between patients with and without PDN in relation to age, retinopathy, nephropathy previous diagnosis, coronary heart disease, glycated hemoglobin, serum creatinine or statin use. No association was found between PDN and cholesterol (r=0.1297, p=NS) or triglyceride levels (r=0.0315, p=NS). But, a positive correlation was found between serum urea levels and MDNS (r=0.2957, p<0.01). However, when considering only the 65 (72.2%) patients with serum urea below 50 mg/dL, there was a positive correlation between total cholesterol and MDNS (r=0.2580, p<0.05) and between triglycerides and MDNS (r=0.2585, p<0.05).

Conclusion: In patients who had serum urea below 50 mg/dL, total cholesterol and triglycerides correlated weakly but significantly to MDNS. Patients who have high cholesterol and triglycerides levels should be considered at higher risk for PDN.
Dermatologic conditions, such as dry skin and callus, are very frequent in patients with diabetes mellitus (DM) and, in fact, increase the risk of important outcomes, as skin lesions, ulcerations, and diabetic foot. Patient, nurse, and physician education are essential steps to prevent and better understand DM patient flow regarding skin conditions and its possible outcomes.

Objective: To describe lack of information regarding dermatologic conditions in DM from a physician’s perspective, and also to suggest new strategies to address this subject.

Materials and methods: A 16-questions questionnaire regarding dermatologic conditions in DM patients was developed and sent to academic specialists (six endocrinologists and two dermatologists), from different geographic locations in Brazil. Subsequently, a panel discussion with all the respondents was performed to validate the responses. During the panel, additional relevant data were collected. The questionnaire and the panel discussion were representative of physician’s clinical practice.

Results: The specialists had mean clinical experience of 25 yrs., with the mean patient volume of 62 patients/month per physician, achieving 496 patients/month. According to questionnaire responses and the panel discussion, skin conditions are present in at least 55% of DM patients. In fact, all participants classified dermatologic conditions in DM as crucial or important, emphasizing that early diagnosis of skin pathologies can avoid the evolution to worse prognosis, such as skin lesions, subsequent infections, diabetic foot, and amputations. In addition, 62.5% of the specialists considered treating dry skin an important step to prevent diabetic foot complications and 50% of the specialists considered hydration an important additional care to DM patients. Also, physician’s and patient’s education regarding dermatology conditions were emphasized by all the specialists.

Conclusions: According to the compiled data from the questionnaire and panel, the lack of information is a crucial issue regarding dermatologic complications in DM patients, due to unrecognized importance of early-stage diagnosis. Simple and common conditions like dry skin can progress to severe dermatological outcomes. In fact, the specialists considered nurses’, physicians’, and patients’ education and early identification and treatment of skin problems in diabetics the main strategies to improve this clinical condition.

A32

Association of pulse pressure with fasting and 2-h plasma glucose in subjects with different degrees of glucose tolerance

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Background: Increased pulse pressure (PP) is a strong predictor of cardiovascular mortality and it has been associated with an increased risk of developing diabetes and its microvascular complications. However, the mechanism underlying the association between PP and abnormalities of glucose metabolism is unclear.

Objective: To study how PP obtained by 24h ambulatory blood pressure monitoring (ABPM) is related to fasting and 2-h plasma glucose in subjects with different degrees of glucose tolerance.

Materials and methods: In a cross-sectional study, 128 subjects (53.1±12.3 y, females 72%) were submitted to a 75-g OGTT (measurement of glucose and insulin) and divided according to glucose tolerance status (normal glucose tolerance [NGT; n=38], prediabetes [PDM; n=53] and diabetes [DM; n=37]). 24-h ABPM was performed. Mean 24h PP was calculated as the difference between mean systolic and diastolic blood pressure (IBP), obtained through 24-h ABPM. Fasting C-peptide and A1C were collected. Body size (BMI) and central obesity (waist circumference) were assessed. Insulin sensitivity index (ISI Stumvoll), insulin resistance (HOMA-IR) and β-cell function (insulinogenic index; Δins30′-0′/ΔG30′-0′) were estimated. A two-sided P value < 0.05 was considered significant.

Results: By ABPM, 24-hour PP progressively increased from NGT to DM (mean±SD; NGT: 45.9±8.5 vs PDM 51.9±10.4 vs DM 57.8±11.1 mmHg; P<0.001). 24-hour PP was positively related to age (r=0.316; P<0.001), waist circumference (r=0.263; P=0.003), BMI (r=0.35; P<0.001), A1C (r=0.438; P<0.001), 2-h glucose level (r=0.424; P<0.001), C-peptide (r=0.286; P=0.001), HOMA-IR (r=0.155; P=0.085) and it was inversely related to ISI Stumvoll (r=-0.474; P<0.001) and to insulinogenic index (r=-0.184; P=0.048). While adjusting for age and waist circumference, pulse pressure was independently associated with 2 hour plasma glucose (R=0.287; P=0.002) and A1C (R=0.241; P=0.010).

Conclusion: According to our data, pulse pressure obtained by 24-h ABPM increases with decreasing of glucose tolerance. It is also an independent predictor of higher 2 hour plasma glucose and A1c levels.

A33

Are A1C levels at the moment of DM diagnosis associated with renal outcomes?

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Background: Hyperglycemia is a risk factor to renal disease (RD). It is recommended that patients with diabetes mellitus (DM) are screened to RD at the moment of the diagnosis, by urinary albumin levels. Glycated hemoglobin (A1C) is one of the available diagnosis test to DM and also a known predictor factor to RD.

Objectives: To determine if A1C levels at the moment of DM diagnosis are associated with future renal outcomes measured by urinary albumin excretion rate.

Materials and methods: This prospective study evaluated 269 patients screened to DM type 2 at a university hospital between 2008 and 2009. All patients performed an oral glucose tolerance test (OGTT), fasting glucose (FG), urinary albumin and A1C measured by colorimetry, immunoturbidimetry (Advia 1800, Siemens Diagnostica) and HPLC (2.2 Tosoh Plus A1C, Tosoh Corporation), respectively. They were identified with DM according to ADA criteria. Between 2010 and 2012, the patients returned and were re-evaluated. Renal outcomes were measured by urinary albumin levels in the follow up, according to KDIGO guidelines. Poisson regression with robust standard errors was performed in those with DM diagnosis, considering the worsening of renal function, measured by urinary albumin levels, as dependent variable and A1C, FG, 2h plasma glucose after OGTT (G2h) levels, age and hypertension as independent variables. Statistical analysis was performed by SPSS 20.0 and p <0.05 was considered as statistically significant.

Results: Of the 269 patients analyzed, 71 (26.4%) had DM diagnosis (44 women, age of 57±12 yrs.). After a follow up of 30±7.0 months, there was no association between A1C, FG nor G2h basal levels with renal outcomes, adjusted for age and hypertension (p >0.05). Only age was risk factor (p <0.001; relative risk 1.074 [1.035-1.114]) to the worsening of renal function, where the increase of one year in age was associated with 7.4% increase in the risk to renal outcomes.

Conclusion: In this small cohort, A1C levels at the diagnosis of DM showed no association with future urinary albumin levels. However, the short follow up time and small number of patients may have been a limitation of this study.

A34

Impact of assessment and treatment of neuropathic pain in patients with chronic diabetic neuropathy assisted in a diabetes reference service

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Background: Diabetic neuropathy is one of the chronic complications of hyperglycemia, which characterizes Diabetes Mellitus. As a result of an indolent course, the absence of signs and symptoms and nonspecific manifestations, it can remain undiagnosed for a long time. One of the
Clinical presentations is the presence of neuropathic symptoms, such as pain, cramps or paresthesia, which can compromise the quality of life.

Objective: The objective of this study was to demonstrate that the pharmacological treatment of neuropathic pain can promote a significant symptomatic improvement assessed by validated scores and that the establishment of a support center in neuropathy constitutes an important measure in the context of multidisciplinary care of the diabetic patient.

Materials and methods: 53 patients were recruited with a mean age of 58 yrs., similar gender distribution (50.9% male and 49.1% female), mostly with type 2 Diabetes Mellitus (83%), average diagnosis time of 18 yrs. and median time for neuropathic symptoms of 2 yrs.

Results: At the first visit, subjects had pain intensity classified as moderate by the Analog Pain Scale, intensity of neuropathic symptoms classified as severe (56.6%) and neuropathic disability rated as moderate to severe impairment (41.5%). Following the prescription of specific pharmacological treatment, 91.6% of patients reported maintenance or improvement of symptoms and only 2.8% reported worsening. It was observed significant improvement in Neuropathic Symptoms Score (p=0.0006) and Analogic Pain Scale (p <0.0001), especially in type 2 diabetic group. There was no change in Neuropathic Disability Score.

Conclusion: This study demonstrated that the existence of a support center for assessment and treatment of painful diabetic neuropathy in a Diabetes reference service allows early diagnosis and intervention in neuropathic symptoms in an effective way.
albumin excretion (UAE) was measured twice and glomerular filtration rate (GFR) was estimated by using the CKD-EPI equation.

Results: A total of 128 patients were evaluated (66 [51.6%] male, mean age 60±10 yrs., duration of diabetes 10±7 yrs., body mass index 28.5±4.3 kg/m², median UAE 11 (3-843) mg/24-h and mean eGFR 95±18 ml/min/m²). In multiple linear regression models, adjusting for using hypolipidemic agents and ACE inhibitors and/or angiotensin receptor blockers, 24-hour UAE was inversely associated with serum levels of total polyunsaturated fatty acids (R²=0.067, β-Standardized Coefficients=- 0.196; P=0.030). On the other hand, in another model adjusting for age and using hypolipidemic agents, eGFR was positively associated with serum levels of saturated fatty acids (R²=0.250, β-Standardized Coefficients=0.238; P=0.004) and negatively associated with serum polyunsaturated fatty acids (R²=0.234, β-Standardized Coefficients=- 0.199; P=0.014), especially linoleic acid (18: 2 n-6) (R²=0.250, β-Standardized Coefficients=- 0.237; P=0.003).

Conclusion: In type 2 diabetes patients, serum polyunsaturated fatty acids were inversely associated with albuminuria. In contrast, these fatty acids, especially linoleic acid might be deleterious to eGFR. Surprisingly, serum saturated fatty acids was positively associated to eGFR in these patients. More studies are needed to clarify these findings.

A36 Association of dietary fat composition with kidney function decline in patients with type 2 diabetes
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Background: Chronic kidney disease is a major microvascular complication of Diabetes Mellitus (DM) and may affect about one third of the patients. Based on the evidence that a proportion of patients may have reduced glomerular filtration rate (GFR) without increased albuminuria, it is recommended to evaluate both parameters. Furthermore, both of them are considered prognostic factors of renal and cardiovascular mortality. Hence, the evaluation of the possible association between dietary fat content and renal dysfunction assessed by GFR is also relevant.

Objective: To evaluate the association between the dietary fat composition and the decline of GFR in type 2 diabetes patients.

Materials and methods: In this prospective cohort study the usual diet of patients was assessed by a 3-day weighed diet record (WDR). Compliance with the WDR technique was assessed by comparing protein intake estimated from 3-day WDR and 24-h urinary nitrogen output. GFR was estimated by using the CKD-EPI equation. After a minimum follow up of one year, a new clinical and laboratory evaluation assessment was performed and eGFR was calculated again.

Results: A total of 368 patients were evaluated (177 [48.1%] male, mean age 60.6±9.7 yrs., duration of diabetes 12.4±8.1 yrs., body mass index 28.5±4.3 kg/m²) with an average follow-up time of 6±3 yrs. In baseline, 30% of patients presented Diabetic Kidney Disease. The median decline of eGFR per year was 3 (-51 – 47) ml/min/m². In multiple linear regression models, adjusting for age, gender, systolic blood pressure and 24-hour UAE, the eGFR decline per year was positively associated with the dietary trans fatty acid intake (% energy) (R²=0.074, β - Standardized Coefficients=0.106, P=0.049). When the patients was separated according to gender, this association remained significant, but only in women (R²=0.112, β - Standardized Coefficients=0.183, P=0.014). No association was observed between other dietary fatty acids and eGFR decline.
Conclusion: In patients with type 2 diabetes, the decline of the glomerular filtration rate seems to be associated with the dietary consumption of trans fatty acid, especially in females.

A37

Evolutionary assessment of endothelial function in metabolic control and microvascular complications in type 1 diabetes mellitus patients

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Background: Long-term type 1 diabetes (T1D) is associated to microvascular complications. In a previous study of our group, we observed that endothelial dysfunction (ED) was present in half of adolescents under 5 yrs. of T1D duration, even before the onset of microvascular disease. Although ED is associated to vascular complications, the natural history and risk of developing these complications is not yet understood.

Objective: The aim of the study was to determine the potential evolution of ED overtime and if its determination could be predictive for albuminuria in T1D patients.

Materials and methods: Observational cohort study with 7 yrs. of follow-up, including 40 T1D patients, mean age of 22.6±4.2 yrs. The assessment of endothelial function and vascular stiffness was performed respectively through flow-mediated dilation (FMD) in brachial artery and dilation mediated by nitroglycerin (NTG%). ED was defined by% of dilation inferior to 8%. Hba1c was measured at 3 months intervals over 7 yrs. Data were analyzed comparatively between 2007 and 2014 for%ED (2007: ED1 and 2014: ED2) and%NTG (NTG1 and NTG2), using t-test for dependent samples and McNemar paired test to comparison.

Results: Data were available of 40 T1D patients, mean follow up of 7 yrs. Mean and SD for ED and NTG were respectively: ED1: 9.6±6.8 vs ED2: 6.9±4.9%, p=0.0032 and NTG1: 22.9±9.8 vs NTG2: 16.8±4.5%, p=0.000. Of 40 patients, 55.0% did not have ED in 2007, and 25.0% of them developed new ED in 7 yrs. Of the patients who had ED in 2007, 27.5% remained in ED in 2014 while 17.5% ED patients in 2007 reverted to normal in 2014. A total of 45% of the patients had ED in 2014, being independent of Hba1c. Hba1c in those with and without ED in 2014 was respectively: 8.6±1.7 and 8.6±1.7% (0.646). Interestingly, 47.5% patients improved ED to normality, despite a slight increase in Hba1c of 0.06±1.9%. The presence of albuminuria was not associated with ED, NTG or Hba1c. The UAE was: 8.7±6.27 vs 25.8±5.4mg/dL in ED and Non-ED, respectively (p=0.784) and 29.6±63 vs 26.2±55mg/dL in NTG or Non-NTG (p=0.761).

Conclusion: Our data showed that in most T1D both ED and vascular stiffness deteriorate significantly after 7 yrs., being reversible in some patients. Our data suggest that T1D duration is the main predictor of deterioration of ED, independently Hba1c or albuminuria. Longer studies are needed to define whether ED can be used as a marker of future atherosclerosis in T1D.

A39

Loss of muscle strength in community-dwelling elderly is associated with type 2 diabetes

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Background: A loss of skeletal muscle mass and strength is frequently observed in older adults. Persons with diabetes have accelerated muscle and strength loss, but the relationship of hyperglycemia to declines in muscle function has not been explored yet.

Objective: To investigate the relationship between type 2 diabetes and low muscle mass and strength in community-dwelling elderly.

Materials and methods: Data was obtained in the Elderly Project/Goiânia, a cross-sectional study comprising 132 community dwelling elderly (>60 yrs.) of Goiânia, Goiânia, Brazil. Muscle mass was estimated by standard methods by using dual-x-ray-absorptiometry (DEXA) and was determined by the skeletal muscle mass index (SMI). Muscle strength was determined by Hand grip strength (hand-GS) with a dynamometer on dominant hand. Diabetic diagnose was identified by self-report or use of hypoglycemic agents. Analyses were performed in STATA 12.0. We calculated the prevalence and the difference ratio was evaluated by the Pearson chi-square test (p<0.05). This study was approved by the Research Ethics Committee of UFG.

Results: Of the 132 elderly studied, 60.9% were women, mean age 70.1 yrs. (±6.63) and mean BMI of 26.7 kg/m2 (±26.7). The mean SMI was 6.69 kg/m2 and 7.50 kg/m2 among men and 6.16 kg/m2 in women (p=0.001). The average FPP was 22.8 kgf (±8.38) and 29.9kgf between men and 18,1kgf in women (p=0.001). The prevalence of diabetes was 18.5%, with higher prevalence in young people aged, 60-69 yrs. (21.7%). Low muscle strength was observed in 25% of diabetic patients (p=0.05) and low muscle mass in 8.3% of diabetics with no statistically significant differences (p=0.05).

Conclusions: Type 2 diabetes is associated with loss of skeletal muscle strength in community-dwelling older adults. Future studies should explore if better glycemic control can preserve muscle strength in diabetes.
Materials and methods: Gene expression was evaluated by qPCR in 55 (US) and 161 (PBMC) participants sorted according to DN stage: absence of DN; incipient DN and overt DN, and according to estimated glomerular filtration rate (eGFR; < or ≥60 mL/min/1.73m²). 26 healthy participants and 13 patients presenting focal and segmental glomerulosclerosis (FSGS) were included, respectively, as control group and as a group with non-diabetic nephropathy in the US experiments. Plasma thiamine concentrations were determined by HPLC.

Results: In the US, SLC19A2 expression was higher in patients with (a) overt DN vs patients without DN (p=0.0090) and to control participants (p=0.017) and (b) eGFR <60mL/min/1.73m² vs eGFR ≥60mL/min/1.73m² (p=0.01). ROC curve analyses demonstrated that SLC19A2 expression in the US was able to discriminate T1D patients according to DN status and to eGFR. Expression of SLC19A2 was negatively correlated with eGFR (p=0.01, r=−0.37) and positively correlated with plasma creatinine (p=0.002, r=0.43) in T1D patients. No association was found between SLC19A2 expression in US and the magnitude of eGFR decline after a median follow-up of 2 yrs. No difference was observed in PBMC SLC19A2 expression between T1D vs control participants. SLC19A3 mRNA was not detected in US and in PBMC of any participant. T1D and control participants showed thiamine plasma concentrations in the normal range, but lower concentrations were found in T1D vs control participants (p=0.0001).

Conclusion: Normal thiamine plasma concentrations and absence of upregulation of SLC19A2 in PBMC suggest that upregulation of this gene in the US of patients with DN is not secondary to thiamine deficiency but to another underlying mechanism.

A42
Prevalence and determinants of diabetic polyneuropathy and diabetic foot complications in a specialized clinic
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Background: Diabetic peripheral neuropathy is one of the common chronic complications of diabetes and a cause of limb amputations. Foot complications are considered to be a serious consequence of diabetes mellitus. At the time of diagnosis, more than 10% of people with type 2 diabetes mellitus have one or two risk factors for foot ulceration and a lifetime risk of 15%. Identifying the extent of this problem and its risk factors will enable health providers to set up better prevention programs.

Objective: The objectives of this study were to determine the prevalence of peripheral neuropathy and diabetic foot complications, describe the clinical features and identify risk factors diabetic patients.

Materials and methods: A cross-sectional study was conducted at Pernambuco Unit of Specialized Care in the city of Limeira. Participants included 216 patients with type 2 diabetes treated at unit from May 2014 to April 2015. All completed an interviewer-administered questionnaire and underwent medical assessment including foot examination and assessment of presence of peripheral sensory neuropathy (PSN). The patients were assigned to a foot risk category which was developed by the International Working Group on the Diabetic Foot (IWGDF).

Results: A total of 97 males (45%) and 119 females (55%) were included. The mean (standard deviation) values were 54.5 (10.4) yrs. for age and 7.8 (7.3) yrs. for diabetes duration. The prevalence of PSN was 71.3%. The polyneuropathy was symptomatic in 110/154 (71.4%) patients. Diabetes duration, age, hypertension, use of insulin and low family income were significantly associated with PSN (p < 0.05). Foot deformity was noticed in 86.7% of patients (40%), 40 (18.5%) patients had a history of ulcers and five patients had amputation of limbs. According to the modified IWGDF classification, 27.8% of all patients were considered as having low-risk (group 0), and 57.9% of the study population were at high risk for pedal ulceration (group 2 and 3).

Conclusions: The prevalence of PSN and high risk for pedal ulceration were very high in this study, demonstrating that diabetes is not
adequately controlled and even culminates in chronic complications. This emphasizes the importance of implementing simple and affordable screening tools and methods to identify high-risk patients and providing foot care education for them as well as treat and control the disease more effectively.

**A43**

**Falls occurrence is related to loss of vibration perception and functional reach in diabetes: a retrospective study**

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**Background:** Falls incidence has a higher prevalence in diabetic patients, but there are few information about the contribution of the specific complications of polyneuropathy. The identification of those factors can increase efficacy of preventive and therapeutic actions to avoid the tragic consequences of falls episodes.

**Aims:** Identify the occurrence of falls in the last 12 months in patients with Diabetes Mellitus (DM) and describe its association with diabetic polyneuropathy (DPN) signs and symptoms and with a functional task.

**Materials and methods:** A cross-sectional, retrospective data analysis of 409 community dwelling diabetic patients was performed to describe, compare and verify possible associations between the variables. We followed the recommendations of international guidelines [1] and defined two main groups: non-fallers (NF, no episode of falls in the past 12 months) and at risk of falling (RF, at least 1 fall in the past 12 months). Patients voluntarily participated in a campaign for prevention and detection of diabetes, during one day of activity. The clinical assessment was composed by (a) questionnaire of Michigan Neuropathy Screening Instrument, (b) tactile and vibration perception [2,3], (c) functional reach test and (d) self-reported falls occurrence questionnaire in the past 12 months. Descriptive statistics, T tests and Chi-Square tests were used to identify differences between groups (α=5%).

**Results:** There were higher occurrences of falls in elderly DM patients than in older adults (Figure 1). There were no differences of DPN-related symptoms, time of DM onset and the number of tactile insensate foot regions between groups. However, the fallers presented decreased vibration perception and lower functional reach test score compared to non-fallers.

**Conclusion:** DM individuals with decreased vibration perception and decreased functional reach test are exposed to higher risk of falls. Those clinical variables can be used to implement falls prevention programs for this population.

**A44**

**Vitamin D deficiency and cardiovascular autonomic neuropathy in patients with type 1 diabetes mellitus**


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**Background:** Low levels of vitamin D have been suggested to have a negative effect on the pancreatic β cell function, being associated with insulin resistance and an increase in inflammatory markers in diabetic patients. However, the relationship between vitamin D levels and diabetes microvascular complications has not been well established yet.

**Objective:** This study aimed to evaluate the association between the levels of 25-hydroxyvitamin D (25(OH)D) and the presence of cardiovascular autonomic neuropathy (CAN) in patients with type 1 Diabetes Mellitus (T1D).

**Materials and methods:** We performed a cross-sectional study including 50 patients with T1D, submitted to the dosage of 25(OH)D levels by chemiluminescence and to computerized autonomic tests for the
Our results showed a correlation of 25(OH)D levels with the presence and severity of CAN in patients with TID. Patients with established CAN presented lower levels of 25(OH)D in comparison to those without CAN (21.5±7.9 vs 31.5±11.3 ng/mL, respectively; p<0.05).

Evaluating the severity of CAN, we observed lower levels of 25(OH)D in patients with established CAN compared to those with incipient CAN or absence of CAN (18.6±6.4 vs 31.5±11.3 ng/mL, respectively; p<0.05).

Additionally, the levels of 25(OH)D were correlated with CAN through 6 of the 7 parameters used in the diagnosis: FM (r=0.28, p<0.05), FB (r=0.33, p<0.01), FA (r=0.35, p<0.01), Valsalva maneuver (r=0.36, p<0.01), 30:15 coefficient (r=0.38, p<0.01) and respiratory coefficient (r=0.31, p<0.05).

Conclusion: This is the first study suggesting the association between 25(OH)D levels with the prevalence and severity of CAN in TID patients. Further studies are necessary to establish whether vitamin D supplementation could influence the progression of CAN in these patients.

**GLYCEMIC CONTROL AND HYPOGLYCEMIA**

**A45**

*Morinda citrifolia l. treatments (noni) reduce glycemia in the model of alloxan-induced diabetes in rats*

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**Background:** Diabetes mellitus is a chronic disease characterized by hyperglycemia which Results from alterations in secretion or insulin action. There is a large number of studies searching for natural products potentially hypoglycemic and presenting a low risk of adverse effects.

**Objectives:** To evaluate the effects of the hydro-alcoholic extract of fruits from *M. citrifolia* on the glycemic profile in rats. Materials and methods: Alloxan (40 mg/kg, iv) was injected in male Wistar rats (250 g) and after 48 h, animals were subjected to blood collection for measurements of blood glucose (mg/dL). Only those showing glycemia levels higher than 250 mg/dL were submitted to the study. The animals were daily administered with 100 and 500 mg/kg of the Noni extract (N100 e N500), 120 mg/kg Metformin (M120) and 120 mg/kg Metformin + 100 mg/kg Noni extract (M120+N100), orally for 1 month. After this period, animals were subjected to another blood collection for blood glucose determination. The untreated diabetic controls (DC) received saline for the same period. For statistical analysis, ANOVA and the Fisher’s exact test showed a significance level of 95% (p<0.05).

**Results:** The differences were considered significant at p<0.05.

**Results:**

- The N100 and N500 groups reduced blood glucose by 63 and 70%, respectively, as related to glycemia levels before treatments (N100: n=7, before: 406.4±31.6, post-treatment: 136.7±22.6); while the M120, M120+N100 and DC groups showed decreases of blood glucose of only 29, 19 and 17%, respectively (M120: n=12, before: 319.8±12.27; post-treatment: 231.1±31.4; M120+N100: n=6, before: 343.0±20.21; post-treatment: 277.4±32.13 and DC: n=9, before: 411.7±15.79; post-treatment: 341.9±28.44).

**Conclusions:** The repeated administration of the hydro-alcoholic extract from the fruits of Morinda citrifolia promoted a significant reduction in blood glucose, after 1 month at the doses 100 and 500 mg/kg, a result not observed after metformin, used as reference. Furthermore, no synergism was presented by the association of Noni extract with metformin, suggesting that Noni exerts its effects by a different mechanism of action. The chemical study of the extract revealed the presence, among others, of phenols in great concentrations and those may be, at least partly, responsible for the observed effects.

**A46**

*Glycemic control associated factors in type 1 diabetes mellitus patients: a cross sectional study*

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A46

**Background:** Type 1 diabetes mellitus is one of the leading chronic diseases in children and represents 5 to 10% of all diabetes cases. The International Diabetes Federation’s atlas described T1D’s incidence in people under 15 yrs. old in the world: the major incidence was found in Finland with 57.6 new cases in 100,000 inhabitants. In Brazil, the incidence is 10.4 cases in 100,000 inhabitants. Intensive treatment, by lowering Hba1c, is effective in reducing the onset and progression of diabetic’s chronic complications. In addition, physical activity, diet based on carbohydrate counting and education about the illness are also measures to improve glycemic control.

**Objective:** Compare sociodemographic factors, physical activity practice, treatment related factors and chronic complications with Hba1c in type 1 diabetes.

**Materials and methods:** A cross-sectional study conducted in the Endocrinology Ambulatory of Governor Celso Ramos Hospital, through a census of records, totaling 48 records. Patients from 14 to 50 yrs. old who had been seen at least twice were included. The illiterate patients, those with renal terminal disease and with hemoglobin <10g/dl were excluded. Glycemic control was evaluated according to sociodemographic factors, lifestyle, factors related to treatment, in accordance with the Brazilian Diabetes Society Guideline. The descriptive and bivariate analyzes by Fisher’s exact test showed a significance level of 95% (p<0.05). Approved by HGRc ethics committee.

**Results:** A prevalence of men (54.17%), with < 25 yrs. of age (56.25%) and more than ten yrs. of disease (52.08%) was observed. The overall Hba1c mean was 8.68% (±2.17); and values ≤ 7% were obtained in 22.92% of the population. Among those with adequate glycemic control, 90.91% lived in Greater Florianópolis, 60% engaged in physical activity, 63.64% used insulin analogues, 90.91% measure self-blood glucose three or more times/day and 100% applied insulin three or more times/day. Of patients with Hba1c ≤ 7, 100% had no chronic complications.

**Conclusion:** Practicing physical activity, conducting intensive insulin therapy, using insulin analogues and be a resident of Greater Florianópolis were the main factors that contributed to the adequate glycemic control. One of the possible actions to be taken based on this study, with the aim of improving glycemic control, would be the implementation of a multidisciplinary team in the Endocrinology Ambulatory, in order to promote educational activities.
Several factors in the patients’ lifestyle affect these values, such as the practice of physical activities, diet, and weight control. 

Objective: To evaluate the progress of T2D patients treated in the institution between January of 2013 and January of 2015, noting the HbA1C control levels.

Material and methods: Review of 361 medical records of the institution, collection and statistical analysis of data. Patients with values of HbA1C below 9%, who are not included in the institution’s system, and those who did not return for follow-up appointments, have been excluded from the study. The patients’ age, gender and ethnicity were not taken into account.

Results: Of the 361 evaluated patients, 244 (67.59%) showed a decrease in the values of HbA1C 03 (0.83%) maintained at the same values; 23 (6.37%) exhibited an increase in the values; and only 35 (9.69%) reached values considered as adequate (<7%) at the end of the follow-up. Many patients, 56 (15.51%), abandoned the follow-up after the first appointment.

Conclusion: The follow-up and treatment provided to T2D patients managed to reduce their HbA1C levels in most cases, although small the fraction of those who attained Results considered ideal. The number of patients who exhibited the opposite result, along with those who discontinued the treatment, poses the question of whether through better scrutiny of patients’ conditions their chances of success might rise.

A48
The reduction of hypoglycemia among inpatients through a multidisciplinary team work using a PDCA approach
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A48

Background: Hypoglycemia is associated with transient cognitive deficits and can result in cardiac arrhythmia, neurological damage, falls or aspiration. Among critical and non-critical inpatients, hypoglycemia increases the risk of death. Since 2012, we had kept the rate of hypoglycemia (proportion of capillary glucose episodes below 60 mg/dL per 100 glucose measurements) well controlled. During the first 3 months of 2014 we were aiming to keep the rate under 0.46%. However, there was an average of 149 episodes/month, which was the rate of 0.57%.

Objective: To improve the frequency of hypoglycemic episodes among inpatients.

Materials and methods: Through a multidisciplinary team (pharmacists, nurses, physicians and nutritional therapists), using a PDCA approach (plan–do–check–act), we evaluated the main causes of hypoglycemia after 04/2014 and establish actions to improve the results.

Results: The most common causes were insufficient CHO intake, excessive glucose monitoring in terminally ill patients and inadequate insulin doses management. Consequently, we implemented protocols to guarantee a minimal intake of CHO (intravenous and/or oral), and discussions with the palliative care staff regarding the reduction of glycemic tests in terminally ill patients and improved the electronic prescription system. In addition, we developed pre-admission inquire to identify patients at risk of hypoglycemia before elective surgery and an electronic alarm to identify drugs associated with hypoglycemia. By these actions, the rate of hypoglycemia progressively reduced from 0.53% (139 episodes) in March/2014 to 0.31% (80 episodes) in December/2014, as observed in Figure 1.

Conclusions: This project demonstrates the importance of integration and involvement of a multidisciplinary team and the importance of adaptation and creation of new standards for continuous process improvement to reduce the frequency of hypoglycemia among inpatients.

A49
Type 1 diabetes mellitus and its glycemic control affect sleep
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A49

Background: In the current and past decades, associations between sleep impairment and glucose control in individuals with diabetes have been unveiled. Sleep disorders and curtailment were shown to deteriorate glycemic control, while glycemic extremes impact sleep quality and melatonin secretion, forming a vicious circle.

Objectives: Our aim with the present study was to identify associations between glycemic control and parameters of the sleep-wake cycle, with emphasis on the sleep quality, of adults with type 1 diabetes mellitus (T1D), a population poorly studied in the sleep field.

Materials and methods: Eighteen non-obese adults with T1D (8 males, age=26.3±5.1), without chronic complications were studied. The following instruments were used during ten consecutive days: sleep diaries (with Visual Analogue Scales for rating sleep quality), actimeters, and a home fingertip glucometer (6.41±1.5 tests a day). The analysis was made using fitted inflated beta regression models with GAMLSS for the response variable sleep quality rate (SQR). Subject-level covariables in this dataset

Figure 1 (abstract A48) Rate of hypoglycemia < 60mg/dL
Background: It is known that better glycemic control reduces the chronic complications of diabetes (DM). The target of the glycemic control is difficult to achieve, and only 25-50% of the patients achieve the goals. Some studies show that different devices for insulin can improve the adherence.

Objectives: Evaluate the glycemic response after changing the insulin syringes (SY) for pens device (PD) in patients chronically decompensated already in insulin use.

Materials and methods: This is a prospective, intervention, non-randomized, phase IV study. We included patients over 60 yrs. old, both sexes, with HbA1c >8.5% using oral hypoglycemic agents and insulin and then we replaced SY by PD. We used human insulin NPH and regular as pens, all patients have received a blood glucose monitor, lancet tapes, capillary blood glucose tests (3 tests/day). HbA1c was measured at baseline, 3 and 6 months. Patients were seen monthly.

Results: Analysis was “intention-to-treat” of the 45 patients included. HbA1c, at baseline was 10.34±0.22, similar to the values 12 and 6 months prior to inclusion. HbA1c was 8.54±0.23 and 8.09±0.21, after 3 and 6 months, respectively, with no difference among them. After 3 months of the end of study, there was a deterioration of HbA1c (9.67±0.38). Patients remained using PD. During the study, there was an increase in total daily insulin dose prescribed (0.84±0.07 to 1.06±0.10UI/kg, p<0.001) and increase in regular/NPH insulin ratio (0.12±0.02 to 1.22±0.04, p<0.001), with no increasing of BMI (31.7±0.72 vs. 32.13±0.79kg/m2, p=0.82).

Moreover, we found no difference in the occurrence of hypoglycemia (p=1.00), at baseline and at the end of study. Regarding blood pressure was not significantly different among visits. We also evaluated quality of life and psychological stress associated with DM with standardized questionnaires, which were not different between the first and last visits.

Conclusion: More frequent medical visits, provision of inputs for the treatment, including the use of PD and performing self-monitoring favored glycemic control. The glycemic goal has been achieved in this group of elderly patients with DM (with a reduction of 2.25% in average HbA1C at 6 months) with increased doses of insulin, especially regular insulin, no significant increase in hypoglycemia. Our data suggest that a change in the management of chronic decompensated elderly diabetics is required. Grants from CNPq and Fundo de Incentivo a Pesquisa do HCPA (PIPE).
and triglycerides (TG) <150 mg/dL. Approved by ethics committee (nº 140073); statistical analysis PASW 20.0.

Results: The mean age was 63±11 yrs., 62% women, 86% white, 9% to observe whether the SEP has any positive effect in the according to the IDF the number of cases worldwide reached 387 million in 2014, while Brazil occupies the 4th place in the overall ranking with over 13 million cases. These data refer to both Type 2 Diabetes (T2D) and T1D. Although T1D affects the minority of patients, it is responsible for many of the serious complications. T1D, usually diagnosed in youth, requires continuous treatment and control that demand care such as diet, medication and lifestyle changes. This project addresses the importance of a Structured Education Program (SEP) for self-care of individuals with Type 1 Diabetes Mellitus (T1D).

Objective: To observe whether the SEP has any positive effect in the treatment of T1D by providing individuals with information about their health-disease situation, leading to an increased awareness, providing skills to become able to manage their condition effectively.

Materials and methods: Forty-seven T1D individuals were followed for 20 months. Values of HbA1c were analyzed and compared. Questionnaires, workshops, individual care, 24-hour support, and semi-structured interview were applied.

Results: Mean HbA1c decreased 1.9% (21 mmol/mol) in one year and a further reduction of 0.9% (10 mmol/mol) was observed after 8 months (p<0.001). Figure 1 Evaluation of overall knowledge showed an increase of 37% when comparing the pre- and post-SEP (p<0.005). Figure 2 Feedback showed 87% improvement of self-management; 81% were more satisfied with current quality of life; 94% acknowledged diet flexibility; 91% were highly motivated to continue treatment appropriately (p<0.005).

Conclusion: Relevant clinical and psychological improvements were demonstrated. The average decrease in HbA1c, the overall knowledge and confidence increase and improved quality of life confirms the importance, necessity and positive outcome of a SEP in diabetes.

A53

The effects of a structured education program on glycemic control in individuals with type 1 diabetes

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Diabetes & Metabolic Syndrome 2015, 7(Suppl 1):A53

Background: According to the IDF the number of cases worldwide reached 387 million in 2014, while Brazil occupies the 4th place in the overall ranking with over 13 million cases. These data refer to both Type 2 Diabetes (T2D) and T1D. Although T1D affects the minority of patients, it is responsible for many of the serious complications. T1D, usually diagnosed in youth, requires continuous treatment and control that demand care such as diet, medication and lifestyle changes. This project addresses the importance of a Structured Education Program (SEP) for self-care of individuals with Type 1 Diabetes Mellitus (T1D).

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Materials and methods: Forty-seven T1D individuals were followed for 20 months. Values of HbA1c were analyzed and compared. Questionnaires, workshops, individual care, 24-hour support, and semi-structured interview were applied.

Results: Mean HbA1c decreased 1.9% (21 mmol/mol) in one year and a further reduction of 0.9% (10 mmol/mol) was observed after 8 months (p<0.001). Figure 1 Evaluation of overall knowledge showed an increase of 37% when comparing the pre- and post-SEP (p<0.005). Figure 2 Feedback showed 87% improvement of self-management; 81% were more satisfied with current quality of life; 94% acknowledged diet flexibility; 91% were highly motivated to continue treatment appropriately (p<0.005).

Conclusion: Relevant clinical and psychological improvements were demonstrated. The average decrease in HbA1c, the overall knowledge and confidence increase and improved quality of life confirms the importance, necessity and positive outcome of a SEP in diabetes.
A54
Factors correlated with poor glycemic control in patients with type 1 diabetes: result of a nationwide survey in Brazil
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A54

Background: Diabetes increases the risk of cardiovascular and microvascular disease, particularly when not properly treated. Despite advances in diabetes management, inadequate glycemic control has been observed in 60% to 80% of patients. The objective of this study was to identify characteristics correlated with poor glycemic control in a large multicenter survey of Brazilian patients with type 1 diabetes.

Materials and methods: We conducted a cross-sectional study in a consecutive sample of patients aged 18 yrs. or older with type 1 diabetes, attending health centers located in ten large cities in Brazil. Data on socio-demographics, treatment, and adherence to treatment were obtained by trained interviewers, using a standardized questionnaire. A peripheral blood sample was collected and HbA1c levels were measured by high-performance liquid chromatography in a central laboratory. Patients with HbA1c >7% were considered to have inadequate glycemic control. HbA1c was described by mean and standard deviation (SD). Bivariate linear regression analysis was performed to identify patients characteristics correlated with serum levels of HbA1c. Statistical significance was set at p<0.05.

Results: Overall, 979 patients with type 1 diabetes were surveyed (mean age, 40 yrs.; female 63.8%). Mean level of HbA1c was 9.4% (SD: 2.22) and the prevalence of inadequate glycemic control was 89.6%. Higher HbA1c levels were correlated with socio-demographics (black race and low education), and treatment-related characteristics: last measurement of HbA1c >12 months ago, irregular finger glucose monitoring, irregular medical visits in the last 12 months, medical treatment performed by a non-specialist, non-participation in diabetes education programs, self-perception of inadequate insulin use, and self-perception of poor diet adherence.

Conclusions: About 90% of the patients with type 1 diabetes in Brazil have inadequate glycemic control and are at increased risk for disease complications. Our findings may help guiding public health programs to improve glycemic control in this population.

A55
Correlates of poor glycemic control in patients with type 2 diabetes: results of a nationwide survey in Brazil
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A55

Background: Diabetes is a metabolic disease that increases the risk of cardiovascular and microvascular disease, particularly when glycemic blood levels are not well controlled. Poor glycemic control is commonly observed in as much as 60% to 80% of patients with diabetes, regardless of advances in diabetes care. The objective of this study was to identify correlates of poor glycemic control in a large multicenter survey of Brazilian patients with type 2 diabetes.

Materials and methods: A cross-sectional study was conducted in a consecutive sample of patients aged 18 yrs. or older with type 2 diabetes, attending health centers located in ten large cities in Brazil. Data on socio-demographics, treatment, and adherence to treatment were obtained by trained interviewers, using a standardized questionnaire. A peripheral blood sample was collected and Hba1c levels were measured by high-performance liquid chromatography at a central laboratory. Patients with Hba1c >7% were considered to have inadequate glycemic control. Hba1c was described by mean and standard deviation (SD). Bivariate linear regression analysis was performed to identify patients characteristics correlated with serum levels of Hba1c. Statistical significance was set at p<0.05.

Results: Overall, 5,692 patients with type 2 diabetes were surveyed (mean age, 61 yrs.; female 66.5%). Mean level of Hba1c was 8.6% (SD=2.3) and the prevalence of inadequate glycemic control was 73%. Poor glycemic control was associated with young age, black or mixed race, low educational attainment and diabetes duration. We also observed that irregular medical visits in the last 12 months, self-perception of poor diet, insulin or oral hypoglycemic adherence were correlated with inadequate glycemic control. Participation in a diabetes health education program was associated with improved glycemic control.

Conclusions: The majority of patients with type 2 diabetes in Brazil has inadequate glycemic control and is at risk for the development of cardiovascular and microvascular disease. Our data may help the development of public health programs to improve glycemic control in this population.

A56
"MellitusOne.", a new technological approach to record, access, share and improve the glycemic control
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A56

Background: The medical sector has joined forces with the technological field in order to produce devices that facilitate health monitoring and diabetes management. However, this reality is not yet available to everyone. In this context, for patients who have diabetes and for their health care team (HCT), collecting and reviewing daily data are extremely important actions for effective treatment adjustments and improvements.

Objectives: Our goal was to develop and test an affordable technological solution for most people with diabetes who use insulin, in order to record and share data with their HCT.

Methodology: A Microsoft® Excel® dynamic spreadsheet, called "MellitusOne.", was created. On its first sheet personal data are inputted and in the second are the blood glucose values, insulin administered (doses and types), food consumed and corrections. On the other two sheets automated charts and graphs are presented (daily and of the last 20 days). In the tables, blood glucose and its percentage in each category are colored according to its value (inside, below and above the target glucose). Moreover, mean,
Results: Seven out of eight declared that would continue using it. The main reasons raised were: easy to see glycemic variation on the graphs, which helps to keep a better glycemic control (5 answers), useful to share with the endocrinologist (2), easy to use (2), easier to take quicker decisions using it (2). Slowness on Apple computers and preference for own homemade spreadsheet was the reason why one volunteer would not continue using it. The main suggestions were: transforming it into an application (to make it more portable), increasing the fields, graphs, and automating more functions. Therefore, seven people found that "MellitusOne." contributed to a better glycemic control.
Conclusion: The results above, pointing towards an easy alternative to follow the glycemic control and take actions to improve it, show us that the spreadsheet “Mellitus One.” is not only useful, but also may be beneficial to this population. At the same time, systemic improvements would enhance its usability.

A57
Insulin lispro low mixture twice daily vs basal insulin glargine once daily and prandial insulin lispro once daily as insulin intensification strategies in patients with type 2 diabetes: A Latin American subpopulation analysis of a randomized trial
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A57
Background/aim: This post-hoc analysis examined the efficacy and safety of twice-daily insulin lispro low mixture (LM25) and once-daily basal insulin glargine plus once-daily prandial insulin lispro (IGL) in a Latin American subpopulation (Argentina, Brazil, and Mexico) of participants with type 2 diabetes mellitus (T2D).
Materials and methods: This phase 4, randomized, open-label, parallel-arm trial included participants aged 18–75 yrs. with T2D who were taking once-daily insulin glargine and stable doses of metformin and/or pioglitazone and had glycated hemoglobin (HbA1c) between ≥7.5% and ≤10.5% and fasting plasma glucose ≤6.7 mmol/L (121 mg/dL). Participants were randomized 1:1 to receive twice-daily LM25 (before breakfast and dinner) or basal insulin glargine (at bedtime) and IGL (before the largest daily meal) in addition to their existing dose of metformin and/or pioglitazone for 24 weeks. The primary efficacy outcome was the change in HbA1c from baseline to Week 24.
Results: A total of 162 participants (80 LM25; 82 IGL) with a mean standard deviation (SD)) age of 57.3 (9.0) yrs. and body mass index of 31.3 (5.2) kg/m2 were included. The mean (SD) change in HbA1c (%) from baseline was -1.5 (1.0) in the LM25 group and -1.0 (1.2) in the IGL group (Figure 1). At Week 24, 35.1% of participants in the LM25 group and 31.6% of participants in the IGL group achieved the target HbA1c <7.0%. Fasting blood glucose and glycemic variability at Week 24 were similar between the 2 groups, as was the mean (SD) total daily insulin dose (LM25=61.0 [27.6] IU; IGL=60.6 [24.3] IU). The mean (SD) rate of total hypoglycemia per 30 days was numerically similar between the two groups (LM25=1.6 [2.2]; IGL=1.8 [2.6] [overall study period]). Mean (SD) weight gain from baseline to Week 24 was 2.4 (2.9) kg in the LM25 group and 1.0 (3.1) kg in the IGL group. Treatment-emergent adverse events were similar between the 2 groups.
Conclusions: The results of this post-hoc analysis in a Latin American population are consistent with the results reported in the trial-level population and suggest that both LM25 and IGL are viable treatment options for insulin intensification in patients with T2D who do not achieve glycemic control on basal insulin glargine. ClinicalTrials.gov Number: NCT01175824.

A58
Efficacy of SGLT2 inhibitors in glycemic control, weight loss and blood pressure reduction: a systematic review and meta-analysis
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A58
Background: Sodium-glucose cotransporter 2 inhibitors (SGLT2i) are a novel antidiabetic class that inhibits glucose reabsorption and produce glycosuria. These medications are being increasingly used as dual therapy with metformin for type 2 diabetes (T2D) treatment, due to their beneficial effect on weight and blood pressure. Three agents are approved for clinical use and they may differ on potency due to inhibition of only renal or both renal and bowel glucose transportation.
Objective: To evaluate the efficacy of SGLT2i, dapagliflozin (DAPA), canagliflozin (CANA) and empagliflozin (EMPA), on HbA1c, weight and blood pressure (BP) in comparison with placebo and other antidiabetic medications.
Materials and methods: MEDLINE, Cochrane central and EMBASE databases were searched for randomised clinical trials (RCTs) including patients with T2D allocated to SGLT2i for at least 12 weeks. A direct and network meta-analysis (NMA) were conducted.
Results: Thirty-nine RCTs were included (25468 patients), CANA 300 mg, EMPA 25 mg and DAPA 10 mg were associated with better glycemic control (HbA1c -1.01%, -0.69%, -0.51%, respectively), and weight loss (-2.66 kg; -1.81 kg; -1.80 kg, respectively) when compared to placebo. In NMA, CANA 300 mg was superior to the others SGLT2i for HbA1c (EMPA 25 mg: -0.22% and DAPA 10 mg: -0.26%), and weight (EMPA 25 mg: -1.06 kg and DAPA 10 mg: -0.84 kg). CANA 300 mg and DAPA 10 mg decreased systolic BP (-4.77 mmHg and -2.66 mmHg, respectively) and diastolic BP (-1.99 mmHg and -1.76 mmHg, respectively) in comparison to placebo. SGLT2i were similar to metformin and sulphonylurea regarding to HbA1c, but superior to DPP4 inhibitors (-0.15%) (Figure 1). Furthermore, SGLT2i were better than metformin, sulphonylurea, and DPP4 inhibitors for reduction of weight (-1.04 kg; -4.76 kg and -2.45 kg, respectively) and systolic BP (-5.86 mmHg; -5.44 mmHg e -4.43 mmHg, respectively). SGLT2i were also better than sulphonylurea and DPP4 inhibitors for diastolic BP lowering (-2.59 mmHg; -1.89 mmHg, respectively). Initial combination of SGLT2i plus metformin resulted in greater reduction of HbA1c than SGLT2i plus DPP4 (-0.53% vs. -0.19%).
Conclusion: In T2D patients, SGLT2i were superior to placebo for all outcomes analyzed, and CANA seems to be the most potent among them. SGLT2i are as effective as metformin and sulphonylurea and superior to DPP4 inhibitors for HbA1c, but more potent than these classes regarding weight and BP reduction.

A59
Comparative effects of a dipeptidyl peptidase-4 inhibitor and of NPH insulin on peripheral nerve conduction of patients with type 2 diabetes
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A59
Background: Studies in animals have suggested that the glucagon-like peptide-1 hormone (GLP-1) has neurotrophic properties that were independent of those related to the improvement of glucose control.
Dipeptidyl peptidase-4 (DPP-4) inhibitors increase GLP-1 levels and are effective in improving metabolic parameters in patients with type 2 diabetes mellitus (T2D) but little is known about its effects on neurological disorders, including peripheral diabetic neuropathy.

**Objective:** To assess the effects of the DPP-4 inhibitor sitagliptin on nerve conduction and their independence on glucose control.

**Materials and methods:** Thirty patients with T2D (39-66 yrs.), diabetes duration of 10.9 yrs., inadequately controlled with metformin plus glyburide (HbA1c between 6.9 to 9.1%) were randomized to receive sitagliptin (n=16) or bedtime NPH insulin (n=14) as add-on therapy. HbA1c, fasting blood glucose, body weight and electroneurography were determined before and after 1 year of treatment.

**Results:** HbA1c levels decreased both in the sitagliptin (8.01±0.57 × 7.36±1.96, p=0.04) and NPH group (8.11±0.64 × 7.34±0.68, p <0.001). The weight of patients remained stable. There was no change in sensory and motor nerve conduction parameters in the 2 groups.

**Conclusions:** Sitagliptin and bedtime NPH insulin were effective in reducing HbA1c, after 1 year of treatment. The improvement of glucose control, the use of sitagliptin or bedtime NPH insulin did not lead to improvement in peripheral nerve conduction in patients with long-standing type 2 diabetes.
A60
Type 2 diabetes: is there any relation between poor control and bone metabolism?
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A60

Background: Numerous evidences suggest that there is a relation between glycemic control and bone fractures in type 2 diabetes individuals. Poorly controlled patients with high blood sugar levels could show higher risk of osteoporosis and/or injuries.

Objective: This study aims to compare the levels of glycemic control with the serum levels of bone formation and resorption markers and the bone mineral density (BMD) in female type 2 diabetes individuals, after menopause.

Materials and methods: A cross sectional evaluation of 41 female type 2 diabetes individuals was performed. Mean age was 62±5.91 yrs. (mean±SD), time of T2D diagnosis 10.15±6.61 yrs., BMI=32.76±6.32. All individuals only used metformin as the anti-diabetic treatment. The glycated hemoglobin (HbA1c) levels were compared to the bone formation markers P1NP and osteocalcin (OC), plus the bone resorption marker CTX as well as lumbar spine, femoral neck and total femoral BMD. Pearson correlation analysis was applied for the total sample, plus comparison between the mean of the groups comprised of quartile 1 (Q1; better control) of HbA1c and quartile 4 (Q4; worse control), through t-test.

Results: The mean of HbA1c was significantly different between the groups Q1 and Q4 (6.7 ±0.001 vs. 8.1 ±0.003% (p<0.001)). Neither significant correlations nor differences between groups Q1 and Q4 were found related to the HbA1c and P1NP levels (r=0.07; p=0.908), OC (r=-0.12; p=0.388), CTX (r=-0.02; p=0.853), lumbar spine BMD (r=0.160; p=0.671), femoral neck BMD (r=0.08; p=0.822) or total femoral BMD (r=0.10 p=0.575).

Conclusion: We found no significant correlation between levels of glycated hemoglobin and bone formation and resorption markers and bone mineral density. There was no difference even when the extreme glycemic control groups were compared.

A62
Somogyi effect as the most common cause of fasting hyperglycemia in T1D patients
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A62

Background: Morning hyperglycemia in patients with type 1 diabetes (T1D) may be caused by the dawn phenomenon, the Somogyi effect or poor glycemic control, diagnoses that lead to different clinical management in each case. Previous reports considered the Somogyi effect as a rare entity in clinical practice.

Objectives: This study aimed to evaluate the frequency and characteristics of fasting hyperglycemia by continuous glucose monitoring system (CGMS) in patients with T1D.

Materials and methods: We analyzed the glycemic profile measured by 72h-CGMS in 85 patients with T1D (29 female), resulting in 255 overnight periods. We assessed the nocturnal glycemic profile and the accuracy of the CGMS sensor per night. Fasting hyperglycemia was categorized into dawn phenomenon when there was no nocturnal hypoglycemia followed by a minimum 10mg/dL rise plasma between 4:00h-7:00h; Somogyi effect when nocturnal hypoglycemia (<70mg/dL) between 0:00h-3:00h was followed by morning hyperglycemia and poor glycemic control when there was sustained overnight hyperglycemia. Clinical data (age, diabetes duration, insulin regime, and HbA1c values) were obtained by chart review and compared to the different causes of fasting hyperglycemia.

Results: Mean age (SD) and disease duration of participants were 30.7 (15.6) yrs. and 13 (11.9) yrs., respectively. Mean HbA1c was 8.1% (1.97%). Mean sensor glucose value was 162.6mg/dL (46.5) and mean absolute difference (MAD%) was 10.8 (4.61); reference: <28, with a correlation coefficient (CC) of 0.92 (0.1). MAD% was similar between all nights but there was a significant difference in CC of night 1 vs. nights 2 (P=0.001) and 3 (P<0.001). Fasting hyperglycemia was observed in 82.4% of patients. Silent nocturnal hypoglycemia was observed in 61.2% of patients. The main cause of elevated morning glucose levels was Somogyi effect (60%), followed by poor glycemic control (27.1%) and dawn phenomenon (12.9%). Comparing clinical characteristics of patients with dawn phenomenon and Somogyi effect yielded no significant differences.

Conclusions: CGMS is a valid diagnostic tool to identify the causes of fasting hyperglycemia status. Somogyi effect was the most common cause of fasting hyperglycemia in T1D patients with poor glycemic control. Therefore, assessing the occurrence of nocturnal hypoglycemia might be important before increasing overnight basal insulin dose.

A61
Hypoglycemia with gliclazide MR in women with type 2 diabetes.
A continuous glucose monitoring study
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A61

Background: Hypoglycemia is usually a limiting factor in the treatment of type 2 diabetes and it may be asymptomatic many times. Sulfonylureas are a group of anti-diabetic drugs associated with an increased risk of hypoglycemia, mainly for users of drug that potentially induce hypoglycemia, can result in incorporation of CGMS into the routine of patients with type 2 diabetes, mainly for users of drug that potentially induce hypoglycemia, can result in a more appropriate and safer glycemic control.

Materials and methods: A total of 19 post-menopausal women, 60.53±1.08 yrs.-old (mean±SE), with type 2 diabetes for 7.89±1.04 yrs., having poorly controlled diabetes with metformin, were studied. Initial glycated hemoglobin (HbA1c) was 7.28%±0.13%. All patients received additional treatment with gliclazide MR at a dose of 60 or 120mg/day (72.63±5.77mg) for an average period of 6 months. At the end of this period, patients were using continuous glucose monitoring system (CGMS) for 3.62±0.10 days. The frequency and duration of the hypoglycemia (glucose <70mg/dL) were calculated.

Results: From a total of 19 women studied, 10 (53%) had at least 1 hypoglycemic episode (mean=0.84 episode/patient/3.6 days using CGMS). From 16 reported hypoglycemic episodes, 94% were asymptomatic. The mean time in the hypoglycemic range among patients studied was 55.53±18.90 min. HbA1c reached at the end of the 6 months was 6.2±0.15%.

Conclusion: CGMS can provide valuable information for patients and physicians of potentially drug-induced hypoglycemia, especially in sulfonylurea users. In this study, 94% of detected episodes were asymptomatic, which increases their likelihood to cause adverse events. From 3.6 days using CGMS, 55.53 min were within hypoglycemic range. The incorporation of CGMS into the routine of patients with type 2 diabetes, mainly for users of drug that potentially induce hypoglycemia, can result in a more appropriate and safer glycemic control.

A63
Impaired awareness of hypoglycemia is associated with progressive loss of heart rate variability in patients with type 1 diabetes
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Background: Hypoglycemia unawareness affects approximately 25% of patients with type 1 diabetes and is strong associated with severe hypoglycemia. Cardiovascular Autonomic Neuropathy (CAN) is one important
factor related to hypoglycemia unawareness, although its role is not fully understood due to conflicting data in the literature. Heart rate variability (HRV) in time and frequency domain has been described as a more accurate method to assess CAN. The objective of the present study was to investigate the relationship between hypoglycemia unawareness and autonomic dysfunction assessed by HRV in time and frequency domain.

Materials and methods: Type 1 Diabetes patients were prospectively enrolled. Hypoglycemia unawareness was evaluated by Pedersen-Bjegaard method and patients were classified into three groups: normal hypoglycemia awareness (NA), impaired hypoglycemia awareness (IA) and hypoglycemia unawareness (UNA). Indices of HRV were evaluated in both time and frequency domain. CAN was diagnosed using cardiovascular reflex tests (Ewing Battery).

Results: The study population comprises 99 patients with a mean age of 25.8±10.9 yrs., mean diabetes duration of 12.8±8 yrs. and mean HbA1c 8.4±1.3% (68±10.4 mmol/mol). There was a progressive increase in age (p=0.001), diabetes duration (p=0.027) and episodes of severe hypoglycemia in the last year (p=0.005) as the degree of perception of hypoglycemia decreases. Early CAN was more prevalent in the group UNA (p=0.017). Measures of HRV in frequency and time domain, high frequency band (p=0.027), total power (p=0.037), the square root of the mean squared differences of successive NN intervals (RMSSD) (p=0.041) were progressively decreased with deteriorating hypoglycemia awareness.

Conclusion: Hypoglycemia awareness impairment in T1D patients is associated with age, duration of disease and the number of severe hypoglycemia episodes in the previous year. Importantly, as hypoglycemia awareness worsens heart rate variability (HRV) decreases denoting a progressive loss of parasympathetic activity on the heart.

Evaluation of hypoglycemic, hypolipidemic and antioxidant effects in vivo of extracts hydroalcoholic of Yacon (Smallanthus sonchifolius)

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A64

Background: Cardiovascular diseases are the leading cause of death worldwide, and dyslipidemia a major risk factor. Feeding is recognized as a major factor related to hypertension, hyperglycemia and dyslipidemia. In the present study, the potential hypoglycemic, hypolipidemic and antioxidant effects of Yacon root were investigated.

Materials and methods: Male Wistar rats were divided into: group 1 (normal control diet), group 2 (control calorie diet), group 3: oral suspension of simvastatin 10 mg/kg, group 4: Yacon leaf extract 20 mg/kg, group 5: Yacon leaf extract 40 mg/kg and simvastatin 10 mg/kg, group 7: Yacon leaf extract 40 mg/kg and simvastatin 10 mg/kg, group 8: Yacon root extract 20 mg/kg, group 9: Yacon root extract 40 mg/kg, group 10: Yacon root extract 20 mg/kg and simvastatin 10 mg/kg, group 11: Yacon root extract 40 mg/kg and simvastatin 10 mg/kg. The formulations were administered once daily by gavage for 14 consecutive days. The hemograms and biochemistry parameters were determined by automated equipment. The oxidative parameters were measured using spectrophotometric methods.

Results: The groups that received the Yacon extract showed improvement of glycemic and lipid profile. The hypercholesterolemic diet increased serum levels of creatine kinase, CK-MB and LDH, but the extract administration decreased the levels of these markers significantly compared to the untreated group. Moreover, the extract, reduced lipid peroxidation, protein carbonylation and frequency of micronucleus induced by hypercholesterolemia and increase antioxidant defenses (CAT, SOD, GPx, GSH, vitamin C, polyphenols) in the blood. Moreover, supplementation of Yacon showed no hepatotoxic or nephrotoxic effect. The hypercholesterolemic diet increased the inflammatory process, evaluated through your markers, and extract administration has improved this parameter. Furthermore, supplementation with the root of Yacon controlled weight gain of animals.

Conclusion: The results suggest that Yacon extract showed a hypoglycemic, hypolipidemic and antioxidant activity, possibly due to its high content of phenolic compounds.

HbA1c shows good correlation with regular post-prandial pre-exercise blood glucose measures in active individuals with type 2 diabetes mellitus

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Aims: This study aimed to verify the correlation between annual average glycated hemoglobin HbA1c and mean capillary blood glucose (BG) with post-prandial and post-exercise in active adults with type 2 diabetes mellitus (T2D) participants of a diabetes education program with emphasis on supervised exercise.

Methods: The data was collected in a cross-sectional study with 103 T2D adults during the year 2009 (April to November). The Program had provided two weekly sessions of multidisciplinary health educational interventions with several modalities of supervised physical exercise (60min each one) and register of post-prandial (i.e. pre-exercise) and post-exercise BG. HbA1c between the stage of the study: beginning (I), 1 month reces ‘washout effect’ (II) and closure of the annual activities (III); mean post-prandial and post-exercise BG were calculated for these respective stages. Continuous variables were expressed as mean and standard deviation and analyzed by multivariate regression test (p < 0.05 assumed).

Results: The annual HbA1c average was 7.5±1.5% with 42.7% of individuals <7.0%. The average post-prandial BG at the stage I was 161.25±56.65 mg/dL and at the stage III was 157.79±49.42 mg/dL (p>0.05), while the stage I average post-exercise BG was 132.45±42.47 mg/dL and at the stage III was 125.50±40.11 mg/dL, a significant difference (p=0.022).

In the last year (p=0.005) as the degree of hypoglycemia episodes in the previous year. Importantly, as hypoglycemia awareness worsens heart rate variability (HRV) decreases denoting a progressive loss of parasympathetic activity on the heart.

The role of sulfonylurea plus basal insulin on glycemic variability compared to basal bolus regime in T2D patients

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Background: It is a common practice to administer basal insulin after oral diabetes agents fail as a first step in insulinization. However, we do not know which regime is better regarding glycemic control: adding basal insulin to sulfonylurea or stopping sulfonylurea and starting a basal bolus regime.

Objective: To compare glycemic variability in T2D patients being treated with two different regimes of diabetes treatment: basal insulin plus sulfonylurea versus basal insulin.

Materials and methods: A retrospective study of a cohort of 51 T2D patients. To evaluate glycemic variability, we collected data from glucometers (acu check 360 software was used to download the data)
all patients that came for physician’s appointments at a public hospital between March and June 2015. We analyzed data of mean capillary glucose and its variability (standard deviation) from the 90-day period preceding the final download date. Glycemia and hba1c were also used for this analysis. Chi-square tests and student’s t-test were performed for statistical analysis, where p < 0.05 was considered significant.

Results: Of the 417 patients included in this study, 51 were eligible for analysis. 11 patients were using insulin plus sulfonylurea (group 1) and 40 were using basal bolus treatment (group 2). The proportion of men and women in each group was 45.5%: 54.5% in group 1 and 32.5%: 67.5% in group 2 (Pearson chi-square p=0.42). There was no difference between treatments regarding A1c and glucose variability (Figure 1).

Conclusion: Sulfonylurea plus basal insulin and basal bolus had the same glucose control and glycemic variability in both patient sample groups.

DIABETES AND PREGNANCY

A67
Food consumption rated by quality index diet (IQD) in pregnant women with gestational diabetes mellitus
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Background: Proper nutrition is important during pregnancy, and especially in those complicated by diabetes.

Objective: Assess food intake by diet quality index (IQD) in pregnant women with Gestational Diabetes (GDM).

Materials and methods: Cohort study transversal and descriptive in 65 pregnant women with GDM. Dietary intake was determined by 24-hour dietary recall (24HR) and a Food Frequency Questionnaire (FFQ), and qualified IQD.

Results and discussion: 67.7% of the women had body mass index (BMI) before pregnancy ≥ 25 kg/m². The caloric value was observed in 24HR 1657±532 kcal. According to the IQD, the diet was adequate in 51.6% of pregnant women. The worst score components were vegetables and dairy products. The intake of meat, sodium and total fat received the highest scores.

Conclusion: IQD, referenced by 24HR and applied as a tool for nutritional assessment showed that the diet was considered inadequate or in need of adjustment in half of the pregnant population evaluated. These inadequacies were related to low intake of vegetables and milk and milk products. These Results indicate the need to prioritize educational prenatal, to encourage the consumption of vegetables and dairy products among these pregnant women with GDM.

A68
Evaluation of biochemical and reproductive biomarkers on gestational period in immunosuppressed Wistar rats with Cyclosporin
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Background: The pregnancy period involves a lot of biological changes, and the use of medication must be taken with extremely caution, especially because of its implications for maternal and fetal health, involving biochemical and reproductive functions in maternal organism. Also, the Cyclosporin A (CLP) is used to avoid possible rejection of transplanted tissues, being one of most immunosuppressant used.

Objective: The objective of this study was to evaluate the effects of immunosuppressive therapy with Cyclosporine A in reproductive and biochemical profile in pregnant Wistar rats.

Materials and methods: The rats were randomized into three groups CONT (treated with tap water), CLP1 (treated with Cyclosporin A 15 mg/kg before and during pregnancy) and CLP2 (treated with Cyclosporin A 15 mg/kg before pregnancy), n=8 per group. The body weight, food and water intake, and glucose were measured weekly. On the 17th day of pregnancy it was evaluated the oral glucose tolerance test (OGTT). The reproductive parameters were determined by fertility indices, pregnancy and childbirth. On the last day of pregnancy (day 21), serum biochemical analysis were performed (total protein, cholesterol, triglycerides from high density lipoprotein (HDL).
cholesterol and very low density lipoprotein (VLDL). The statistical significance was considered p<0.05.

Results: It was observed a progressive increase in body weight during the pregnancy in all groups compared to the first day. In addition, the continuous use of this drug decreased food intake and slightly blood glucose. The reproductive parameters have not changed. The glycemic curve generated by OGTT show the timepoint of 120 min of CLP1 group was increased related to other groups. In biochemical evaluation, serum cholesterol and HDL were unchanged, but the treatment with the drug led increase in protein concentration (CLP2), triglyceride and VLDL (CLP1) and also an increase in ALT activity, AST and reduced (in both groups).

Conclusion: The use of Cyclosporine A during pregnancy has some security for weight gain, lipid metabolism and also maternal insulin action in maternal organism.

A69 Evaluation on physiological biomarkers pre and during gestacional period in immunossuppressed Wistar rats with mycophenolate sodium

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A69

Background: The use of medication during pregnancy should be taken with caution, especially because of its implications for maternal and fetal health. The mycophenolate sodium (MFS) is used to avoid possible rejection of transplanted tissues and organs by inhibiting T and B lymphocyte proliferation.

Objective: To evaluate the effects of maternal immunossupression by MFS on physiological parameters in rats.

Materials and methods: The rats were divided into three groups: rats treated with water (CONT=10) rats orally treated with MFS (20mg/Kg) daily for 15 days until a positive diagnosis of pregnancy (MICO-1=10) and rats orally treated with MFS (20mg/Kg) daily for 15 days prior to and during 21 days of pregnancy (MICO-2=10). It was weekly evaluated body weight, blood glucose, and water and food intake (before and during pregnancy). Statistical significance was p <0.05.

Results: In the pre-pregnancy period, although there were no changes in body weight variables, the continuous treatment with MFS decreased food and water consumption and also increased blood glucose (MICO-2). During pregnancy period, these rats presented a reduction of the body weight, maintaining a mild hyperglycemia level (about 170 mg/dL).

Conclusion: The continued use of MFS during pregnancy can be considered toxic, damaging the maternal health, lead to mild hyperglycemia state plus some toxic data (low food and water intake). This study shows that MFS use is not recommended during pregnancy freely and should be replaced by another immunosuppressant.

A70 Evaluation of biochemical and reproductive biomarkers in pre and during gestational period in immunossuppressed Wistar rats with mycophenolate sodium

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Background: The pregnancy period involves a lot of biological changes, and the use of medication must be taken with extremely caution, especially because of its implications for maternal and fetal health, involving biochemical and reproductive functions in maternal organism. Also, the mycophenolate sodium (MFS) is used to avoid possible rejection of transplanted tissues.

Objective: to evaluate the effects of maternal immunossupression by MFS on reproductive and biochemical profile in rats pre and during pregnancy period.

Materials and methods: The rats were divided into three groups: rats treated with water (CONT=10) rats orally treated with MFS (20mg/Kg) daily for 15 days until a positive diagnosis of pregnancy (MICO-1=10) and rats orally treated with MFS (20mg/Kg) daily for 15 days prior to and during 21 days of pregnancy (MICO-2=10). It was evaluated on the 17th day of pregnancy the Oral Tolerance Glucose Test (OGTT) and on day 21 the rats were anesthetized and killed by decapitation and thus measured reproductive parameters (Index fertility, childbirth, pregnancy and number of live births and resorption) and serum biomarkers (lipid parameters and liver transaminases) Statistical significance was p <0.05.

Results: In pregnancy period, there were no changes in glucose data during OGTT evaluation, although MICO-2 rats presented higher glyceremia compared to other groups (CONT and MICO-1), with 170mg/dL. Furthermore, the MICO-2 rats presented other negative effects, including dead rats and total resorption of fetuses. The biochemical evaluation showed decreasing of rates of serum lipid (cholesterol and lipoprotein fractions, triglycerides and alanine aminotransferase).

Conclusion: The continued use of MFS during pregnancy can be considered toxic, damaging the maternal and fetal health, lead to mild hyperglycemia, fetal loss with changes in maternal lipid metabolism. The association of immunossupression of MFS with gestational period is not recommended, and should be replaced by another immunosuppressant.
Conclusion: DM induced during pregnancy and maintained in the postpartum period in Wistar rats resulted in impairment in kidney and these alterations may be related to changes in the expression of p-p38 and p-JNK MAPK.

A72
Do differences exist in the weight of fetus, placenta and umbilical cord in normal pregnant women and in well controlled gestational diabetic pregnant women?
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Background: The weight of fetus, placenta and umbilical cord are important parameters that can reflect the environment where the fetus will grow. We analysed these parameters in well controlled gestational diabetic pregnant women (GDP) and compare this data with normal pregnant women (NG) to reveal the importance of this regulation.

Objectives: The present search wants to show the importance of the control of the gliemia levels in pregnant women that develop GDP based on parameters that can reflect the environment where the fetus will grow.

Materials and methods: The weight of fetus, placenta and umbilical cord were measured in 30 (thirty) normal pregnant women and in 17 (seventeen) controlled gestational diabetic pregnant women met in HUSM (University Hospital of Santa Maria). The measurements of weight of fetus were made immediately after the delivery and the macroscopy exam of placenta and umbilical cord were made 24 (twenty four) h after the delivery using a precision scale. A statistical analysis was made using SPSS 17 with Mann Whitney Test considering significant p values <0.05.

Results: Fetal, placental and umbilical cord medium weights obtained first in NG and after in GDP in the macroscopy exam were respectively: 3.387±0.95g, 3.633±0.80g, 496g±93g and 559g±171g; 34±14g and 48±19g. The statistical analysis showed no significant difference between the values obtained of NG and GDP.

Conclusion: The results allowed us to conclude that fetal, placental and umbilical cord weight studied in NG and in GDP have measures not significantly different. These results show the importance of pre natal control of the alterations that GDP can have in metabolism. Although we can see a tendency of higher parameters in GDP, these numbers don’t significantly affect the growth of the fetus in well controlled GDP.

A73
Effect of exercise in pregnant rats with mild diabetes in the immunological system and biochemical profiles
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A73

Background: The practice of exercise aiming diabetes control is common, also during pregnancy. However, the potential benefits and risks of exercise during pregnancy, complicated or not by diabetes, is unknown.

Objective: To evaluate immunological and biochemical biomarkers of the moderate intensity physical exercise after embryo implantation in pregnant rats with mild diabetes.

Materials and methods: The experimental severe diabetes was induced in newborn female Wistar rats in the first day of birth by intravenous injection of Streptozotocin in a dose of 100 mg/Kg. In adult life (110 days) the rats were submitted to oral glucose tolerance test (OGTT) to confirm the moderate diabetes. After its confirmation, rats were mated and randomly assigned to 4 experimental groups (minimum n=13 animals/group): Control: diabetic pregnant rats exposed to exercise; Diabetic: diabetic pregnant rats without exercise; Diabetic Exercise: diabetic pregnant rats exposed to exercise. The moderate intensity exercise program was swimming, from the 7th to 20th days of pregnancy. On days 0 and 17 of pregnancy, it was performed OGTT. At day 21 of pregnancy, the rats were anesthetized and the blood collected to evaluate immunological and biochemical parameters. Maternal organs (heart, liver, spleen and kidneys) were removed and immediately weighed to obtain its relative weight. Analysis of variance followed by Tukey’s test were used, and the differences were considered statistically significant when p< 0.05.

Results: The exercise did not alter any parameters in non-diabetic exercised rats compared to control rats. The mild diabetes animals presented increase in gliemia, triglycerides, very-low-density lipoprotein (VLDL), and relative liver weight in relation to non-diabetic groups. The exercise in diabetic rats only increased the relative kidney weight.

Conclusion: Exercise during pregnancy did not alter biochemical and immunological profiles in mild diabetes, although this practice did not affect de non-diabetic rats.

A74
Evaluation of lipid homeostasis in the late gestational period of rats exposed to dexamethasone
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A74

Background: Glucocorticoids (GCs) may be prescribed under restriction during pregnancy to the treatment of inflammatory-related diseases or to ensure the proper development of the fetus in the preterm delivery. GC treatment is known to cause several metabolic side effects including dyslipidemia. There are some evidences for increased plasma triacylglycerol (TAG) levels during the late period of normal gestation in rats.

Objectives: We aimed to elucidate whether dexamethasone administration during the late period of gestation alters lipid homeostasis.

Materials and methods: Adult female Wistar rats received dexamethasone (0.2 mg-kg-1-day-1) diluted in the drinking water from days 14 to 19 of gestation (PD) or at equivalent days in non-pregnant/virgin rats (nPD).

Results: Partial Results demonstrated that dexamethasone treatment induced significant weight loss in virgin rats and abolished the weight gain in the pregnant rats (p<0.05). Dexamethasone treatment also reduced food intake in both pregnant and non-pregnant rats compared with their control groups (p<0.05). It is also observed a significant decrease in fasting glycemia in pregnant groups compared with non-pregnant rats at days 13 and 20 of gestation (p<0.05 only in PC group). Fasting TAG levels were similar between all groups at day 13 of gestation, but at day 20 of gestation pregnant rats showed a significant hypertriacylglyceridemia compared with non-pregnant rats; an effect that was more pronounced in PD vs. PC group (p<0.05). Are-under-curve obtained through the oLTT revealed lipid intolerance in the pregnant vs. non-pregnant rats, but the AUC were similar between PD and PC groups. Rats treated with dexamethasone exhibited higher TAG values along oLTT compared with their controls (p<0.05).

Conclusion: We conclude that dexamethasone treatment in the late period of gestation impairs weight gain and exacerbates the hypertriacylglyceridemia and lipid intolerance caused by pregnancy. Additional studies focusing on molecular mechanisms-related to these side effects merit investigation. These data highlights the importance of individual monitoring while dexamethasone is administered in the gestation.

A75
Hba1c levels are increased in patients with gestational diabetes carrying the T/T genotype of the rs1990760 polymorphism in the IFIH1 gene
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A75
Gestational diabetes mellitus (GDM) is diabetes diagnosed in the second or third trimester of pregnancy that is not clearly overt diabetes. This condition is a common complication of pregnancy, being associated with both maternal and neonatal adverse outcomes. Several studies have indicated that viruses play an important role in the pathophysiology of diabetes. IFIH1/MDA5 gene encodes a cytoplasmic receptor that recognizes viral nucleic acids, playing a major role in the immune response against viruses. Accordingly, the rs1990760 G/A polymorphism in the IFIH1 gene has been associated with type 1 diabetes mellitus in different populations. Considering that the MDA5 receptor is expressed in human placenta, we therefore hypothesized that the rs1990760 G/A polymorphism could be also associated with GDM.

Objectives: To investigate the association between the IFIH1 rs1990760 polymorphism and GDM and/or its clinical characteristics in a Southern Brazilian population. Moreover, we aimed to analyze IFIH1 expression in placenta from GDM patients and healthy pregnant women according to different rs1990760 genotypes.

Materials and methods: We analyzed 129 patients with GDM (cases) and 144 pregnant women without GDM (controls). The polymorphism was genotyped by RT-PCR using TaqMan MGB probes (Life Technologies). IFIH1 expression in placenta from 70 cases and 36 controls were evaluated using RT-qPCR.

Results: Genotype and allele frequencies of the rs1990760 polymorphism did not differ between GDM patients and non-diabetic controls (P=0.702 and P=0.708, respectively), and adjustment for ethnicity did not change these results. In GDM patients, fasting glucose levels, body mass index and age were not significantly different between rs1990760 genotypes. However, T/T genotype carriers had increased levels of glycated hemoglobin (A1c) as compared to G allele carriers (5.9 ± 0.4 vs. 5.4 ± 0.5, P=0.007). IFIH1 expression in placenta was similar among the three genotypes of the rs1990760 polymorphism (P=0.05). Interestingly, IFIH1 expression in placenta was decreased in patients with GDM as compared to controls (7.0 ± 4.2 vs. 9.7 ± 9.4, P=0.044). Accordingly, IFIH1 expression was inversely correlated to A1c levels (r=-0.549, P=0.035).

Conclusions: This study suggests an association between the T/T genotype with increased levels of A1c. Furthermore, IFIH1 gene expression seems to be associated with protection for GDM, and it was inversely correlated to A1c levels.

A76 Effect of Hancornia speciosa aqueous extract treatment on biochemical parameters in diabetic pregnant rats

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A76

Background: Hancornia speciosa, commonly known as mangaba, is used by pregnant women for diabetes treatment, but their effects and possible maternal biochemical repercussions are unknown.

Objective: To evaluate the effect of Hancornia speciosa aqueous extract treatment on biochemical parameters in serum and oxidative stress in liver of diabetic and non-diabetic pregnant rats.

Materials and methods: Diabetes was induced by streptozotocin (40 mg/Kg) in virgin female Wistar rats. After diabetes induction, rats were mated. The pregnant diabetic rats were divided in four experimental groups (n minimum=12 animals/group): Non-diabetic; Non-diabetic Treated; Diabetic; and Diabetic Treated. Oral administration of aqueous extract of H. speciosa flowers was given to non-diabetic and diabetic pregnant rats at 8 mg/kg/day for the whole pregnancy. On day 21 of pregnancy, all rats were anesthetized and killed. The blood and liver were collected. The biochemical parameters (glycemic level, alanine aminotransferase [ALT], protein, cholesterol, triglycerides, High-density level lipoprotein [HDL] and hepatic oxidative stress biomarkers [malondialdehyde [MDA], superoxide dismutase [SOD], catalase, total glutathione, thiol group] were analyzed. Analysis of variance followed by Tukey’s test was used. Differences were considered statistically significant when p<0.05.

Results: After treatment with H. speciosa aqueous extract, non-diabetic and diabetic rats presented no glycemic changes. Both diabetic groups presented higher levels of triglycerides and cholesterol and ALT activities, and also decreasing in serum protein levels compared to non-diabetic animals. Moreover, the treatment with H. speciosa in diabetic group increased HDL-cholesterol, and decreased malondialdehyde (MDA) levels compared to diabetic group.

Conclusion: The aqueous extract from H. speciosa leaves failed to modify the maternal hyperglycemia, biochemical parameters and stress oxidative.

A77 Effect of Hibiscus rosa sinensis aqueous extract treatment on biochemical parameters in diabetic pregnant rats

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A77

Background: The medications for diabetes treatment does not present with full efficient, so there is a search for new alternatives, one being the use of herbal medicines. Hibiscus rosa sinensis, commonly known as rose mallow, is widely used in Brazilian folk medicine for the diabetes treatment.

Objective: To evaluate the effect of Hibiscus rosa sinensis aqueous extract treatment on biochemical parameters and oxidative stress in diabetic and non-diabetic pregnant rats.

Materials and methods: Diabetes was induced by streptozotocin (40 mg/Kg) in virgin female Wistar rats. After diabetes induction, rats were mated. The pregnant diabetic rats were divided in four experimental groups (n minimum=12 animals/group): Non-diabetic; Non-diabetic Treated; Diabetic; and Diabetic Treated. Oral administration of aqueous extract of Hibiscus rosa sinensis flowers was given to non-diabetic and diabetic pregnant rats at increasing doses: 100 mg/kg from day 0 to 7 of pregnancy, 200 mg/kg from day 8 to 14 and 400 mg/kg from day 15 to 21. On days 0, 7, 14 and 21 were measured glycaemia. On day 21 of pregnancy, all rats were anesthetized and killed, and the blood and liver were collected. The biochemical parameters (glycemic level, alanine aminotransferase [ALT], protein, cholesterol, triglycerides, High-density level lipoprotein [HDL] and hepatic oxidative stress biomarkers [malondialdehyde [MDA], superoxide dismutase [SOD], catalase, total glutathione, thiol group] were analyze. Analysis of variance followed by Tukey’s test was used. Differences were considered statistically significant when p < 0.05.

Results: After treatment with Hibiscus rosa sinensis extract, non-diabetic and diabetic rats presented no glycemic changes. All the experimental groups showed decreasing in HDL levels compared to control group. Both diabetic groups presented higher ALT activity and MDA concentration. Also, the diabetic group presented high levels of triglycerides and total cholesterol compared to control group. The treatment with H. rosa sinensis in diabetic group was able to decrease the triglycerides and ALT levels compared to diabetic non-treated animals.

Conclusion: The treatment with chalices of H. rosa sinensis aqueous extract showed no hypoglycemic effect and also did not alter other biochemical parameters and the stress oxidative biomarkers. However, this plant improves the biochemical parameters mainly in diabetic rats.
Objectives: To evaluate the effect of B. holophylla aqueous extract treatment on biochemical parameters in blood and oxidative stress in diabetic and non-diabetic pregnant rats.

Materials and methods: Diabetes was induced by streptozotocin (40 mg/kg) in virgin female Wistar rats. After diabetes status confirmation, rats were mated. The pregnant diabetic rats were divided in four experimental groups (n minimum=12 animals/group): Non-diabetic; Non-diabetic Treated; Diabetic and Diabetic Treated. Oral administration of leaves aqueous extract of Bauhinia holophylla was given to non-diabetic and diabetic pregnant rats at increasing doses: 200 mg/kg between day 0 and 7 of pregnancy, 400 mg/kg between day 8 and 14 and 800 mg/kg between day 15 and 21. On day 21 of pregnancy, all rats were anesthetized and killed, and the blood and liver were collected. The biochemical serum parameters (glycemic level, alanine aminotransferase [ALT], protein, cholesterol, triglycerides, High-density level lipoprotein [HDL]) and hepatic oxidative stress biomarkers (malondialdehyde [MDA], superoxide dismutase [SOD], catalase, total glutathione, thiol group) were analyzed. Analysis of variance followed by Tukey’s test was used. Differences were considered statistically significant when p<0.05.

Results: Non-diabetic and diabetic rats presented no glycemic changes. All of the experimental groups showed decrease values in HDL levels compared to control group. Both diabetic groups showed higher levels of triglycerides, ALT, and MDA, and decreasing levels in catalase. Moreover, the treatment with B. holophylla in diabetic group decreased triglycerides and cholesterol levels and increased HDL compared to diabetic non-treated animals.

Conclusion: The aqueous extract from B. holophylla leaves failed to modify the maternal hyperglycemia and stress oxidative. However, this plant improves the biochemical parameters.

Table 1 (abstract A79) Anthropometric data of the total sample and stratified by the classification of pre-pregnancy Body Mass Index (PPBMI) in a sample of pregnant women at diagnosis of Gestational Diabetes Mellitus, Rio Grande do Sul/Brazil, 2014. [Mean±SD or Median (interquartile range) or n (%)]

<table>
<thead>
<tr>
<th>Feature</th>
<th>Total (n=76)</th>
<th>&lt; 25 (n=21)</th>
<th>≥ 25 (n=25)</th>
<th>≥ 30 (n=30)</th>
<th>p**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight gain before diagnosis (kg)</td>
<td>8.1 (2.2 – 11.1)</td>
<td>9.0 (7.6-11.1)*</td>
<td>9.2 (2.5-13.9)*</td>
<td>3.4 (0.1-9.0)*</td>
<td>0.002</td>
</tr>
<tr>
<td>Below the recommended</td>
<td>26 (34.2)</td>
<td>4 (19.0)</td>
<td>7 (28.0)</td>
<td>15 (50.0)</td>
<td>0.166</td>
</tr>
<tr>
<td>Adequate</td>
<td>4 (5.3)</td>
<td>2 (9.5)</td>
<td>1 (4.0)</td>
<td>1 (3.3)</td>
<td></td>
</tr>
<tr>
<td>Above the recommended</td>
<td>46 (60.5)</td>
<td>15 (71.4)</td>
<td>17 (68.0)</td>
<td>14 (46.7)</td>
<td></td>
</tr>
<tr>
<td>BMI at diagnosis (kg/m²)</td>
<td>32±5.8</td>
<td>26±2.0*</td>
<td>30±3.1*</td>
<td>37±5.4*</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Low weight</td>
<td>1 (1.3)</td>
<td>1 (4.8)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Normal weight</td>
<td>16 (21.1)</td>
<td>14 (66.7)*</td>
<td>2 (8.0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>22 (28.9)</td>
<td>6 (28.6)</td>
<td>14 (56.0)*</td>
<td>2 (6.7)</td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>37 (48.7)</td>
<td>0 (0)</td>
<td>9 (36.0)</td>
<td>28 (93.3)*</td>
<td></td>
</tr>
</tbody>
</table>

a, b, c=mean/median significantly different between groups
*association found
p**=comparison between groups
BMI=Body Mass Index
To identify the presence of GDM risk factors during pregnancy, we observed a high prevalence of risk factors for GDM in this cohort study including 362 GDM women. BMI is associated with greater weight gain compared to total GWG, which was 10.1±7.5 kg (range: -8.0 to 36.3 kg). Appropriate weight gain occurred in 25% of women, excessive in 37.5% and insufficient in 37.5%. Postpartum lifestyle habits, data. Pre-pregnancy nutritional status and weight gain were classified according to the Institute of Medicine guidelines. Current Body Mass Index (BMI) was classified by gestational week, according to Atalah. Because the risk of developing GDM gradually increases in overweight and obese women, the total sample was divided into three pre-pregnancy BMI groups for comparison: BMI <25 kg/m², BMI ≥25 kg/m² and <30 kg/m² and BMI ≥30 kg/m². Pearson Chi-square test, analysis of variance and Kruskal-Wallis were employed.

Results: Seventy-six women were evaluated, 53 (69.7%) had 10 yrs. of education or less and 23 (30.3%) had 11 yrs. or more. In this sample there was a high prevalence of: unfavorable pre-pregnancy nutritional status (overweight or obesity), gestational weight gain above recommendations (PPBMI >25 kg/m² is associated with greater weight gain compared to obese), family history of diabetes, advanced age (38.2%) and low levels of physical activity (data shown in Figure 1).

Conclusion: We observed a high prevalence of risk factors for GDM in this sample. An adequate pre-pregnancy nutritional status was associated with gestational weight gain above recommendations. These results emphasize the need for pregnant women to be professionally monitored so that modifiable risk factors can be managed.

A81
Maternal weight gain adequacy is associated with newborn birth weight in gestational diabetes mellitus
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A81

Background: Gestational diabetes mellitus (GDM) is diagnosed in up to 18% of Brazilian women and is commonly related to pre-gestational obesity; superimposed weight gain during pregnancy may adversely contribute to maternal and fetal outcomes.

Objective: To evaluate weight gain patterns in women with GDM and its relation to newborn birth weight.

Materials and methods: Cohort study including 362 GDM women classified according to their pre-gestational body mass index (BMI). Gestational weight gain (GWG) was considered insufficient, adequate or excessive based on the Institute of Medicine 2009 recommendations for each pre-pregnancy BMI class. Newborns were classified as large (LGA), appropriate (AGA) or small for gestational age (SGA) according to the Alexander curve.

Results: Total GWG was 10.1±7.5 kg (range: -8.0 to 36.3 kg). Appropriate weight gain occurred in 25% of women, excessive in 37.5% and insufficient, in 37.5%. Adverse maternal outcomes (cesarean section, hypertension and postpartum dysglycemia) were similar among groups, as were prematurity rates. Obese women with excessive GWG had higher rates of LGA when compared to the other groups (28% vs 8% (insufficient) vs 6% (adequate), p=0.003). SGA rates were higher in women with normal BMI and insufficient GWG compared with the appropriate weight gain group (24% vs 0%; p=0.002).

Conclusion: In women with GDM, excessive GWG, especially in obese women, was associated with increased risk of LGA. Insufficient weight gain was associated with increased SGA in women with normal BMI. Only 25% of women gained weight as recommended by Institute of Medicine 2009.

A82
Diabetes mellitus and symptoms of sleep apnea are associated with adverse delivery outcomes
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A82

Background: Diabetes is a well-known obstetric risk factor. Sleep apnea is an emerging risk factor for diabetes and may affect gestation as well. Apnea symptoms such as snoring, tiredness and observed apneas predict the risk for sleep apnea. Hypertension, age and obesity are predictors of apnea, diabetes and gestational complications.
Objective: To associate risk for apnea detected by questionnaire with delivery complications, controlling for diabetes and classical obstetric risk factors.

Materials and methods: In a prospective cohort design, 158 women answered a version of the STOP-Bang questionnaire adapted for pregnant women using age cutoff at 35 yrs. and excluding male gender (STOP-Ban); risk for sleep apnea was considered present when score>2. Obstetric history and physical examination were obtained. Both gestational and pre-gestational diabetes were considered for the analyses. The hospital records were reviewed for delivery outcomes. Preterm birth, premature rupture of membranes, non-elective cesarean section, low birth weight, and non-reassuring fetal condition were considered adverse delivery outcomes. Seven classical gestational risk factors were used to adjust the multivariate models.

Results: Delivery data was obtained from 144 women with a mean (±SD) age of 29±6.6 yrs., gestational age of 24±8.9 weeks; body mass index 28.7±6.5 kg/m², blood pressure 113±16/69±9 mmHg. In this sample, 13 women (8%) had diabetes and 41 (28%) had a positive STOP-Ban. In univariate analysis, diabetes increased 12% (relative risk: 1.12; 95% CI 1.03-1.22) while positive STOP-Ban increased 3.84 (1.48-9.9) times risk of delivery complications (P=0.004). The other significant risks in this sample were previous cesarean section and nulliparity. In multivariate analysis, previous cesarean delivery and nulliparity remained significant. The risk introduced by diabetes increased to 8.7 (1.02-74) while positive STOP-Ban maintained the relative risk at 3.79 (1.33-10.8). The R squared for the model increases from 0.23 to 0.28 when STOP-Ban is included.

Conclusion: In our study, diabetes in pregnant woman is associated with adverse delivery outcomes, even controlling for classical gestational risk factors. When positive questionnaire for sleep apnea is added to the model, the predictive value increases. Identifying symptoms of sleep apnea in pregnant woman may potentiate the preventive influence of prenatal care in minimizing maternal-fetal morbidity.

A83
Comparative study of perinatal outcomes between pregnant women with gestational diabetes mellitus diagnosed by the new IADPSG and the old ADA criteria
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A83

Background: In 2010 the International Association of Diabetes and Pregnancy Study Group (IADPSG) suggested new values for the diagnosis of gestational diabetes mellitus (GDM). These values, also accepted in 2013 by the World Health Organization, are lower than those used previously, which resulted in an increase in the number of pregnant women with this diagnosis. It is still controversial if IADPSG/WHO criteria is cost-effective and safe.

Objective: To compare perinatal outcomes of pregnancies from women with GDM diagnosed in 2004 by the former ADA criteria with those diagnosed in 2014 by the IADPSG criteria /WHO.

Materials and methods: Data were collected on medical records from pregnant women with GDM who required insulin treatment followed in 2004 and in 2014 at the Maternity School of the Federal University of Rio de Janeiro (UFRJ). The criteria for indicating insulin were the same in both groups: Fasting plasma glucose (PGP) above 95 mg/dL or above 140 mg/dL 1 hour postprandial, 7 days after initiation of diet therapy. It was used SPSS to perform comparative analyzes of the incidence of abortion, hypertensive disorders of pregnancy (HDP), preterm birth, birth weight and weight adequacy for gestational age between the groups.
Results: GDM diagnosis in 2014 were made only by two abnormal FPG in 36 (50.7%) women and in 20 (28.2%) pregnant women it would not be diagnosed by the old criteria. Women from both yrs. did not have differences on average BMI (29.5 ± 26.6 kg/m²; p = 0.10) nor in age (30.3 ± 32.0 yrs.; p = 0.16). Among the 28 patients analyzed in 2004, 7 (25%) of them delivered a newborn large for gestational age (LGA), while in 2014, the 71 analyzed patients, 3 (4.2%) had LGA infants; p < 0.001. The mean weight of newborns in 2004 was 3575 grams, while in 2014 was 3181 grams; p < 0.001. There were no statistical differences between abortions, HDP and prematurity rates.

Conclusion: The findings of this retrospective study in which we compared maternal and fetal endpoints based on two different diagnostic criteria indicates that in women with GDM treated with insulin, intervention is more effective in those diagnosed through the new criteria proposed by IADPSG/WHO. We concluded that diagnose DMG using a higher sensitivity test improves weight parameter of newborns.

A85
High rate of hypoglycemia in diabetic pregnant women on use of glyburide
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A85

Background: During pregnancy, glycemic control in type 1 diabetes (T1D) is essential. However, this can lead to hypoglycemia due to insulin resistance. The study objective was to investigate the frequency of hypoglycemia in diabetic pregnant women using glyburide.

Materials and methods: We conducted a retrospective study of pregnant women with type 1 diabetes mellitus (T1D) treated with glyburide. The variables analyzed were age, pregnancy duration, weight, and glycemic control. The hypoglycemia rate was assessed using the criteria of the American Diabetes Association (ADA).

Results: A total of 20 patients were enrolled, with a mean age of 30.3 ± 5.7 years and a mean gestational age of 27.6 ± 4.2 weeks. The mean body weight was 80.4 ± 12.2 kg, and the mean BMI was 27.2 ± 5.0 kg/m². The mean HbA1C was 7.1 ± 1.2%, and the mean hypoglycemia rate was 0.97 events per patient-month. The most frequent hypoglycemia event was symptomatic hypoglycemia, occurring in 14 patients (70%). The mean time to recovery was 10 ± 5 minutes.

Conclusion: The use of glyburide in pregnant women with type 1 diabetes is associated with a high rate of hypoglycemia, with symptomatic hypoglycemia being the most common event. Further studies are needed to determine the optimal treatment approach for these patients.

A86
Adiponectin levels and waist circumference, waist-hip ratio and conicity index in type 1 diabetes patients
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A86

Background: Adiponectin is a protein synthesized by adipose tissue which has an inverse relationship with obesity and insulin resistance. Previous studies demonstrated that low plasma adiponectin levels are associated with type 2 diabetes mellitus and risk of cardiovascular disease. The study aims to evaluate the association between adiponectin levels and anthropometric measurements in pregnant women with type 1 diabetes mellitus (T1D).

Materials and methods: Cross-sectional study in outpatient adults with T1D in a hospital in southern Brazil, data collected from 2008 to 2013. The anthropometric measurements used were waist circumference (WC), waist-hip ratio (WHR), waist-to-height ratio (WHR), body mass index (BMI), and conicity index (CI) and lipid accumulation product (LAP). Serum adiponectin was measured using a commercial ELISA kit (Invitrogen®, USA) and was analyzed in tertile (tertile 1 ≤ 10.26 µg/mL, tertile 2 between 10.27 and 18.27 µg/mL and tertile 3 > 18.28 µg/mL).

Results: The 122 subjects studied (50.8% women) had mean age of 38.7 ± 11.3 yrs. and median of adiponectin 31.1 µg/mL (8.8–22.9 µg/mL).

TABLE 1: Adiponectin levels and waist circumference, waist-hip ratio and conicity index in type 1 diabetes patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median (IQR) µg/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adiponectin</td>
<td>31.1 (24.9–41.4)</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>88.8 (78.0–99.0)</td>
</tr>
<tr>
<td>Waist-Hip Ratio</td>
<td>0.51 (0.49–0.53)</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>24.0 (23.0–26.0)</td>
</tr>
<tr>
<td>Conicity Index</td>
<td>0.62 (0.55–0.67)</td>
</tr>
</tbody>
</table>

Conclusion: The study revealed a significant positive correlation between adiponectin levels and anthropometric measurements in pregnant women with type 1 diabetes mellitus (T1D). Further studies are needed to determine the clinical implications of these findings.
Adiponectin was negatively correlated with WC (r=-0.19, p=0.04), WHR (r=-0.232, p=0.01) and CI (r=-0.18, p=0.04). Individuals of the first tertile of adiponectin (lowest levels) had higher values of WC, WHR and CI when compared with individuals of the other tertiles. After gamma regression analyses, adjusted for age, WC (Beta=0.03; p=0.001), WHR (Beta=-4.86; p=0.001) and CI (Beta=-5.67; p=0.001) remained negatively associated with adiponectin. Variables like BMI, WHR, LAP, total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, ultra sensitive C-reactive protein and insulin resistance were not associated with adiponectin levels in correlation analysis.

Conclusions: Waist circumference, waist-hip ratio and conicity index were associated with low serum adiponectin levels in adults with T1D. The conicity index had a stronger association with adiponectin. As anthropometric measurements can be easily accessed through physical examination and might be indicative of cardiovascular risk in this population, this information should not be neglected by the health care professionals.

### A88

**Type 1 diabetes associated with other autoimmune diseases: is there any association with glycemic control and microvascular complications?**

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**Background:** Patients with type 1 diabetes (T1D) may develop additional autoimmune diseases. However, it is not clear whether this is associated with a worse metabolic control or more frequent microvascular complications.

**Objective:** To evaluate if T1D patients with additional autoimmune diseases have differences in the glycemic control and microvascular complications compared with patients solely with T1D.

**Materials and methods:** This is an observational cross-sectional study. Patients with T1D associated with another autoimmune disorder were selected from all the T1D patients that regularly attended the outpatient clinic of the Diabetes Unit. A group of patients of the same outpatient clinic without those disorders was randomly selected as a control group.

The presence of retinopathy, nephropathy and last hemoglobin A1C (HbA1C) were retrieved from medical charts. The data were analyzed at SPSS using U test Mann Whitney for continuous variables and chi square test for nominal variables. A p value of 0.05 was established.

**Results:** 36 patients out of 374 T1D patients were found to have other autoimmune disorders and 39 without those diseases were included as the control group. The mean age and T1D duration were 28.8 ±10 and 17.9 ±6 yrs., respectively. 63% were females and 37% males. The mean duration of diabetes was 17.56 yrs. in the autoimmune disorders group and 18.31 yrs. in the control group, without statistical difference (p=0.451). The frequency of other autoimmune diseases were as follows: hypothyroidism (61.1%), hyperthyroidism (16.7%), rheumatoid arthritis (2.8%), scleroderma (2.8%), celiac disease (5.6%), ulcerative colitis (2.8%), polyglucalondar syndrome (2.8%), autoimmune cirsrhosis (2.8%), dermatomyositis (2.8%). Patients with other autoimmune disorders had higher HbA1C levels than controls (8.5% ±1.54 vs 7.66% ±1.22, p=0.003), but did not show differences in the prevalence of nephropathy or retinopathy (p=0.14 and 0.15, respectively).

**Conclusion:** This study indicates that patients with T1D and additional autoimmune diseases have a poorer glycemic control, with higher levels of HbA1C, but no differences in the frequency of diabetes complications. Further longitudinal studies should be performed to identify if the worse glycemic control will lead to a higher frequency of microvascular complications over time.

### A90

**In-hospital experience with insulin degludec (IDeg)**

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**Background:** Glycemic control is critical for in-patients and dysglycemia is associated with worse prognosis and higher mortality. Insulin therapy is considered the best treatment on this scenario and basal insulin analogues, such as insulin glargine (IGlar) and IDeg, could be useful options, however there are no studies comparing IGlar and IDeg evaluating glucose variability (GV) in hospitalized patients, neither the transition between them.

**Objective:** To present a case series describing the efficacy and safety of IDeg in-patients with diabetes using GV and rate of hypoglycemia when compared with IGlar.

**Materials and methods:** Retrospective analysis of blood glucose obtained with point-of-care testing of 10 diabetic patients admitted at Bandeirantes Hospital, São Paulo, between October 2014 and April 2015, previously treated with IGlar for a minimum of 7 days and switched to IDeg for at least 7 days monitoring the hospitalization. Parameters studied included GV, standard deviation (SD), coefficient of variation (CV) and mean glucose levels, obtained from software PX Abbott. Hypoglycemia was defined as blood glucose (BG)<70mg/dL and it was severe if BG <40mg/dL. Basal insulin dose was compared on the last day of both, after achievement of steady state.

**Results:** 3/10 patients had type 1 diabetes mellitus (T1D) for over 10 yrs., previous treatment with insulin therapy in a basal-bolus regimen. Average
age was 46 yrs. and mean HbA1c was 9% and no benefit could be noticed. 7/10 patients had type 2 diabetes mellitus (T2D), with duration of >10 yrs., the majority had previous insulin treatment. Mean age was 70 yrs. and mean HbA1c was 9.7%. All T2D patients maintained CV, and 57% had a reduction in SD, improving GV. Basal insulin dose with IDeg was lower at discharge as compared to IGlar in T2D. Severe hypoglycemia events were diminished after switching (see Figure 1).

**Conclusions:** In this report, GV was lower in T2D patients treated with IDeg as compared to IGlar, although the same could not be seen in T1D, perhaps due to the small number of patients included. More studies in this population are needed to confirm this hypothesis and continuous glucose

<table>
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<th>Sex</th>
<th>Age (y)</th>
<th>Type of DM</th>
<th>Cause for in-hospital admission</th>
<th>Previous DM Treatment</th>
<th>Duration of DM (y)</th>
<th>CV IGlar vs IDeg</th>
<th>SD IGlar vs IDeg</th>
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<th>Basal insulin dose IGlar vs IDeg at discharge</th>
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<td>89</td>
<td>2</td>
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<td>Basal insulin + OAD</td>
<td>&lt;5</td>
<td>29% vs 24%</td>
<td>49.11 vs 36.39</td>
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<td>2</td>
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<td>70.11 vs 44.98</td>
<td>1 vs 0</td>
<td>14 vs 12</td>
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<td>37% vs 59%</td>
<td>62.67 vs 124</td>
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<td>91.62 vs 121.8</td>
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<td>53.18 vs 99</td>
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<td>20 vs 20</td>
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</tbody>
</table>

Y: years; M: male; F: female; DM: diabetes mellitus; OAD: oral antidiabetic medication; CV: coefficient of variation; SD: standard deviation; hypo: hypoglycemia; vs: versus.

Figure 1 (abstract A90) Summary of results
To evaluate the changes in food intake, body composition and biochemical markers among patients during eight-week following Gastric Bypass Surgery Roux-Y (RYGB), in a multidisciplinary approach team.

Materials and methods: This prospective study included 22 women undergoing RYGB, of which 6 had pre-diabetes, and 1 was diabetic. The team consisted of an endocrinologist, a surgeon, a nutritionist and a psychologist. Anthropometric, nutritional and biochemical parameters were analyzed preoperatively and 14, 28, 42 and 56 days after surgery. Specifically, 4 goals were set: 1) to describe the presence of morbidities associated with obesity, and their evolution after surgery; 2) to study the alterations in the biochemical variables after the RYGB proceeding; 3) to evaluate the nutritional changes related with the pre- and post-surgery times; and 4) to follow the changes in body mass index (BMI) and weight loss during pre- and post-surgery, on 4 different time lapses after surgery.

Results: After 56 days of surgery, the rate of pre-diabetes and diabetes dropped from 32% to 5% of the patients. An increase in calorie intake was documented from days 14 to 56 after surgery. A greater intake of protein was also noticed, though a lower intake of iron and calcium was also present. Decreases in body weight and BMI were associated with reduced blood levels of total cholesterol, VLDL-C, LDL-C, triglycerides, and glucose. Weight loss and decreased BMI were reported as well. Dyslipidemia was found among 50% of patients before surgery, and only 1 among 22 patients still had dyslipidemia after surgery.

Conclusions: A significant reduction was documented in the prevalence of prediabetes and diabetes among patients undergoing bariatric surgery, along with an increase in calorie intake after surgery. This study is important for small groups of surgical intervention in obese diabetic and prediabetic patients, in order to better understand approaches towards this high-risk population.

A92

Results of an endocrine follow-up of obese pre-diabetic and diabetic patients before and after bariatric surgery, through an evaluation of nutritional and hormonal variables, analyzed 14, 28, 42 and 56 days after surgery at Uberlândia-Mg, Brazil

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A92

Background: Obesity and diabetes are chronic metabolic diseases, regarded nowadays as serious public health challenges. The treatment of severe obesity is effectively achieved through bariatric surgery, resulting in a better control of diabetes and metabolic markers of disease.

Objective: To evaluate the changes in food intake, body composition and biochemical markers among patients during eight-week following Gastric Bypass Surgery Roux-Y (RYGB), in a multidisciplinary approach team.

Materials and methods: This prospective study included 22 women undergoing RYGB, of which 6 had pre-diabetes, and 1 was diabetic. The team consisted of an endocrinologist, a surgeon, a nutritionist and a psychologist. Anthropometric, nutritional and biochemical parameters were analyzed preoperatively and 14, 28, 42 and 56 days after surgery. Specifically, 4 goals were set: 1) to describe the presence of morbidities associated with obesity, and their evolution after surgery; 2) to study the alterations in the biochemical variables after the RYGB proceeding; 3) to evaluate the nutritional changes related with the pre- and post-surgery times; and 4) to follow the changes in body mass index (BMI) and weight loss during pre- and post-surgery, on 4 different time lapses after surgery.

Results: After 56 days of surgery, the rate of pre-diabetes and diabetes dropped from 32% to 5% of the patients. An increase in calorie intake was documented from days 14 to 56 after surgery. A greater intake of protein was also noticed, though a lower intake of iron and calcium was also present. Decreases in body weight and BMI were associated with reduced blood levels of total cholesterol, VLDL-C, LDL-C, triglycerides, and glucose. Weight loss and decreased BMI were reported as well. Dyslipidemia was found among 50% of patients before surgery, and only 1 among 22 patients still had dyslipidemia after surgery.

Conclusions: A significant reduction was documented in the prevalence of prediabetes and diabetes among patients undergoing bariatric surgery, along with an increase in calorie intake after surgery. This study is important for small groups of surgical intervention in obese diabetic and prediabetic patients, in order to better understand approaches towards this high-risk population.
Conclusion: KPD is a challenging syndrome for GPs and endocrinologists. Its prevalence has been increasing, but diagnosis allows for fast intervention and accurate treatment. The mechanisms of damage of beta cells are still unknown; therefore, more research is still needed.

**A94**

Case report: Cushing syndrome clinical presentation related to pigmented nodular adrenal disease

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A94

Background: Patient case report of secondary type 2 diabetes description are the proportion of adverse hospitalized patients with diabetes (DM) and stress hyperglycemia. The average HbA1c in inpatients and outpatients were respectively less than or equal to 6.9%; 57% and 90.85%; 7.9%: 25.55% and 7.72%, greater than 9%; 17.02% and 1.70%.

Purpose: The importance of hypercortisolism research in patients due to inadequate glycemic control.

Materials and methods: Free Cortisol dosage request in urine 24 h. In return visit, the two urinary free cortisol samples showed increased values (first sample: 717.6 and second sample: 304.5µg/dl). The hypercortisolism was confirmed by non-suppression of serum after 1 mg dexamethasone overnight cortisol 18.6 (Confirmatory is > 1.5mcg/dl). The measurement of serum ACTH showed adrenal etiology (ACTH independent SC). Other pituitary baseline tests and bone densitometry were normal. Abdominal computed tomography and pelvis showed the presence of multiple nodular formations, smaller than 1 cm, grouped with faint contrast enhancement located in the region of above glands.

Results: The hypothesis being held PPNA – Primary Pigmented Nodular Adrenal Disease. It was started full insulinization in order to glycemic control, performed pre-operative tests/exams and forwarded to urology team for surgical resolution.

Conclusion: We observed the importance of hypercortisolism research in this patient due to inadequate glycemic control for the diagnosis of a rare disease, PPNA. The Primary Pigmented Nodular Adrenal disease is often associated with ACTH independent Cushing’s syndrome, characterized by adrenal glands of small or normal size with multiple pigmented and small cortical nodules.

**A95**

The influence of glycated hemoglobin in a study comparing patients who required hospitalization or not

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A95

Background: Hyperglycemia can cause deleterious effects in the body as inflammation. The glycated hemoglobin (HbA1c) plays a key role in monitoring of glycemic for reporting the retrospective index of plasma glucose.

Objective: To evaluate the HbA1c as a prognostic marker in relation to need or not of hospitalization in patients with other diseases.

Method: A study conducted at the Hospital Samaritano lasting five yrs. The HbA1c was analyzed outpatient and hospitalized for various clinical conditions. With regard to patients, according to capillary hyperglycemia observed at admission, verified by a Glucose approved by the FDA (Food and Drug Administration) Precision Xtra (Abbott) was collected HbA1c, according to NUMAD Protocol (Multidisciplinary Center for Assistance the diabetic). It was considered hyperglycemia blood glucose values > 140 mg dl, according to the American Diabetes Association. Outpatients collected according to routine medical request. HbA1c was analyzed by High Performance Liquid Chromatography (HPLC) method. Parameters were established for analysis of glycated hemoglobin equal to or less than 6.9%, 7% to 9%, and greater than 9%. Statistical differences were considered significant at p < 0.05.

Result: Evaluated HbA1c of 2433 inpatients and outpatients 48,164. It was also found adherence to hospital protocol, starting with 300 requests, progressing to the last year with 656 requests HbA1c for patients with hospital hyperglycemia. The average HbA1c in inpatients and outpatients were respectively less than or equal to 6.9%: 57% and 90.85%; 7.9%: 25.55% and 7.72%, greater than 9%: 17.02% and 1.70%.

Conclusion: The Diabetes Control and Complications Trial (DCCT) and United Kingdom Prospective Diabetes Study (UKPDS), determined the use of HbA1c as a laboratory parameter in control of DM. It is known that the HbA1c can be used as a parameter in determining the risk of progression to microvascular and macrovascular disease in DM, however, little is known about the involvement of other diseases and their complications. A well-established hospital protocol can be a critical tool in controlling blood glucose by checking HbA1c. Our study demonstrated that patients with higher HbA1c have greater need for hospitalization besides the pathology, evidencing this method as an important prognostic marker and predictive of need for hospitalization.
A97

Diabetes and weight gain after bariatric surgery, due to Cushing's syndrome

Vagner Rosa Bizaro, Lis Marina Mesquita Araujo, Julio Cesar Salles Santos, Alessandro Gomes Lima, Paola Calafon Resende, Ana Luiza Conceição de Jesus, Theara Castro Nicolau, Denise Rosso Tenório Wanderley Rocha, André Rocha Jorge, Alberto Krayyem Arbex

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A97

Background: The term Cushing’s syndrome (SC) describes a condition resulting from prolonged exposure to excessive glucocorticoids. The routine use of abdominal image procedures has significantly increased the incidental finding of adrenal masses. A documentation of the presence of endogenous hypercortisolism is made with salivary, urinary or serum cortisol measurements, using samples collected with appropriate timing and/or after the use of low doses (1mg) of dexamethasone.

Materials and methods: E.A.R, 45 yrs. old, female, referred to our Service in 2013, due to the presence of a tumor in right adrenal discovered in abdominal TC. This exam was realized as a routine AFTER bariatric surgery (BS) in 2004. She told us that she lost 40 Kg after surgery. However, in 6 months her weight gained 20Kg with no clear reason. Increased blood pressure and hyperglycemia appeared. She related pain in limbs, alopecia and amenorrhea, a year ago. In use of: Losartan 100mg/day, Spironolactone 200mg/day, carvedilol 25mg/day, aspirin 100mg/day, simvastatin 20mg/day, omeprazol 20mg/day, furosemide 40mg/day. Physical exam: Weight: 89Kg, height: 1.68m, BMI: 35.6Kg/m², WC: 116cm, Blood pressure: 200x120mmHg, HR: 104bpm. Proximal muscle weakness, abdominal striae, moon face, hump back, blurred vision, neurological, musculoskeletal, skin and hearing alterations. Results: A1c: 8% (/N<5,7), TSH: 0.7mUI/L (N: 0.3-4.2), ACTH: 18.8pg/ml (N: 7.2-63.3), basal cortisol: 24.5mcg/ml (N: 7-28), aldosterone: 7ng/dl (4-31), androstenedione: 1.5ng/dl (N: 0.8-4.4), catecholamins: 179mcg/24hs (N: 190-450), urinary cortisol: 1089mcg/24hs (N: 10-90), DHEA: <15mmol/L (N: 0.7-4.5), estradiol: 19.6ng/dl (N: <3), renin: 4.9ng/ml/h (up, N: 1.5-5.7), testosterone total: <12pg/ml (N: 0.3-2.5), FSH: 11mUI/ml (menopause N: >30), LH: 12.1mUI/ml (N: >15), prolactin: 10.3mcg/L (N: 2-15), supression test after 1mg of dexamethasone->cortisol: 22.48mcg/dl (N<1,8). We performed an overnight test after 1mg of dexamethasone->cortisol: 22.48mcg/dl (N<1,8). We performed an overnight test after 1mg of dexamethasone (1mg, N: <1.8). We started metformin 1700mg/d, cetonconazol 80mg/dia and insulin NPH 40U/d. Referred to surgery.

Conclusions: Since undiagnosed CS might result in severe perioperative complications in patients already at increased risk, this case report underlines the importance of a careful endocrine evaluation of morbidly obese patients. Obese subjects scheduled for BS may reveal undiagnosed dysfunctions that might be performed in obese patients undergoing BS.

A98

Prevalence of overweight, obesity and metabolic syndrome in HIV-infected patients

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A98

Background: Lipodystrophy syndrome or HIV metabolic syndrome is characterized by alterations in the lipid and glucose metabolism, excess and redistribution of body fat and hypertension. Despite the highly active antiretroviral therapy (HAART) bring many benefits to carriers of the HIV virus, metabolic changes can occur as side effects, increasing cardiovascular risks.

Objective: To assess the prevalence of overweight, obesity and metabolic syndrome in HIV-infected patients on HAART.

Materials and methods: We measured the weight and height and calculated body mass index (BMI). We also performed biochemical tests of lipid profile and fasting glucose. Systemic blood pressure was measured on the right side using a digital sphygmomanometer. Waist circumference was measured from the midpoint between the last rib and the iliac crest. The criteria proposed by the National Cholesterol Education Program III (NCEP-ATP III) to metabolic syndrome classification were used.

Results: We studied 281 patients (120 female and 161 male) with a mean age of 44.0 (±10.2) yrs. BMI averaged 25.82 (±5.65) kg/m². The prevalence of obesity was 18.50% and the overweight, 31.31%. Metabolic syndrome was present in 51.24% of patients (55.00% in females and 48.4% in males).

Conclusions: The high prevalence of overweight/obesity and metabolic syndrome highlights the importance of early nutritional intervention to prevent cardiovascular complications in this group of patients.

A99

Older patients are at increased risk for renal posttransplantation diabetes mellitus

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A99

Background: Posttransplantation diabetes mellitus (PTDM) is a metabolic complication related to the use of immunosuppressive medication after renal transplant. Identifying patients at highest risk of PTDM would help clinicians in their management, once PTDM is associated with higher number of graft rejection and death in the long-term.

Objectives: The aim of our study was to determine the risk factors associated with PTDM development at the fourth month after renal transplantation.

Materials and methods: All patients without diabetes who underwent renal transplant at a University Hospital between July 2012 and June 2015 were included. PTDM was diagnosed according to current ADA criteria at four months after transplantation. Poisson regression with robust standard errors was performed with PTDM as dependent variable and the possible risk factors under study (age, sex, type of donor, immunosuppressive type, family history of DM, pre-transplant BMI and fasting plasma glucose) as independent variables. P-value <0.05 was considered as statistically significant.

Results: One hundred fifty-eight patients were included in the study and 24.1% had PTDM diagnosed at four months after transplantation (50.6% men, mean age 46.1±13.1 yrs.). The only factor associated with PTDM in our cohort was age (p<0.001; relative risk 1.064 [1.033-1.095]). Each one year increase in age was associated with 6.4% higher risk for PTDM.

Conclusions: Our cohort showed high incidence of PTDM at four months after renal transplantation. Older patients should be counseled of their incremental risk for PTDM, since the proper management can reduce the risk of graft rejection and death in the long-term.

A100

New onset diabetes mellitus after kidney transplant: prevalence and risk factors


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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A100

Background: New onset diabetes mellitus after transplant (NODAT) has been described in 4-25% of kidney transplant recipients. It is not only a major factor leading to dysfunction and deterioration of the allograft, but also has a significant impact on cardiovascular risk and patient survival. Several risk factors have been linked to this condition such as age, class of immunosuppressive drug, obesity and family history of diabetes. However this has been poorly studied in our population.

Objective: To identify the prevalence and the major risk factors associated with NODAT after kidney transplantation in our population.
Materials and methods: We performed a retrospective evaluation of patients who underwent kidney transplant from 1994 to 2014 and were not diabetic before the procedure. The prevalence of NODAT was established through the ADA criteria. Clinical and epidemiologic data were retrieved by review of medical charts and analysed with SPSS 17.0. A χ² test was considered significant. Results: A total of 109 patients were studied (41.5% female and 58.5% male) Their mean age was 52 (±9.7) yrs. old (range: 27 to 72). Among them, 35 developed NODAT (31.5%). Those who developed NODAT were older than others (mean age 44.9 ±10.1 Vs 40.6 ±10.3; p < 0.03). NODAT was more common in those who underwent hemodialysis before the transplant (38.8% Vs 8.3%; p < 0.016) and that used immunosuppressive therapy with mycophenolate (90.9% vs 73%; p < 0.03). BMI before transplantation (p < 0.07), gender (p = 1.0), ethnicity (p = 0.94), type of organ donor (p = 0.69), family history of diabetes (p = 0.79) and use of other immunosuppressive drugs, like tacrolimus (p = 0.5), sirolimus (p = 0.22), cyclosporine (p = 1.0) and corticosteroid (p = 0.15), were not associated with NODAT in our patients. The majority of patients using corticosteroid (90.5%) used prednisone dosage ≤ 5 mg/day. In patients who developed NODAT, 28% used sulfonylureas alone, 14.3% used metformin alone, 5.7% used DPP4 inhibitors, 2.8% used sulfonylures and insulin, 17.1% used metformin with insulin and 22.8% used insulin alone. Conclusion: NODAT occurs in approximately one third of patients that underwent kidney transplant in our population. The development of diabetes in these individuals is associated with older age at the time of surgery, hemodialysis before transplant and surprisingly with use of mycophenolate. This finding could be explained by the more common use of this drug in our center than in others.
wards, 21.6% died and 3.1% had other destinations. Comparing diabetics and non-diabetics, there were more invasive procedures (55.3 vs 44.6%, p=0.049) and hemodialysis (66.7 vs 33.3%, p=0.03) in the first group. Regarding mortality, 28.3% of diabetic patients died, compared to 15.7% of non-diabetic patients. In patients with diabetes, the number of antibiotics was an independent mortality predictor (p=0.02; OR 2.058; CI 1.29-3.284). In the group as a whole, the mortality predictors were age (p=0.044; OR 1.028, CI 1.001-1.057) and number of antibiotic used (p=0.001; OR 1.954, CI 1.385-2.757).

**Conclusion:** As expected in intensive care, in both groups mortality was associated with age and number of antibiotics used. However, in patients with diabetes care should be taken as patients have a higher mortality ratio and often demand more invasive procedures and hemodialysis. Despite not so old, several of these patients may have previous DM related renal impairment.

### Table 1 (abstract A102) The patients’ metabolic profile after the treatment

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<td>510</td>
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<tr>
<td>HDL (mg/dL)</td>
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<td>32</td>
<td>45</td>
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<td>Fasting plasma glucose (mg/dL)</td>
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<td>67</td>
<td>200</td>
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<tr>
<td>HbA1c%</td>
<td>8.5</td>
<td>5.9</td>
<td>10</td>
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increasing muscle glucose uptake and insulin-dependent increase intestinal glucose utilization. But like any drug metformin also has side effects and what interests us in this work is to study the chronic treatment with metformin, which may be accompanied by a slight decrease absorption of vitamin B12 in the distal ileum and occasionally folate. Studies have identified the existence of a connection between Diabetes Mellitus and dementia. Hyperglycemia can be a significant factor for the incidence of Alzheimer’s and a secondary cause of dementia. The Type 2 Diabetes Mellitus is associated with cognitive and functional deficits. One of the Required laboratory test in the etiological investigation of a dementia syndrome is the serum levels of vitamin B12. Under these conditions, the diagnosis is based largely on clinical history, as well as the neuropsychological profile.

Objective: Through cross-sectional evaluate the influence of Metformin in elderly patients with and without dementia, on the levels of vitamin B12

METHOD Study across 110 elderly dementia patients from the discipline of neurology at the Santa Casa de São Paulo and 100 of ambulatory diabetes, where we analyzed and compared the progression of dementia and values of B12.

Results: Figure 1.

Discussion and conclusion: According to the results, we noticed and we proved that the Metformin influenced on reducing the amounts of vitamin B12 and when we compare the values of vitamin B12 in relation to age of all patients being diabetics or those with cognitive impairment, we found values with great statistical significance, demonstrating a linear decreases Vitamin B12 according to the increasing age of the individual. Also the value of Chi-Square close to one emphasizes that there is a tendency in the study population and not a finding at random. The hypothesis of a dementia related to diabetes as a secondary cause is a doubt as the majority of patients uses metformin, which decreases the amounts of B12 which is included in laboratory research on dementia.
Diabetes mellitus (DM) is a common comorbidity of Cushing’s syndrome (CS) and plays an important role in morbidity and death of patients with uncontrolled hypercortisolism. Some authors define DM in CS as a ‘specific type of diabetes secondary to endocrinopathy’, although others judge it as a classical form of type 2 DM. Glucocorticoid (GC) excess causes pancreatic beta cell dysfunction and insulin resistance, which correlates with hypercortisolism level. If Cushing’s disease (CD) remission implicates on DM resolution remains unclear.

**Objectives:** To assess DM prevalence in CD patients and DM resolution rate after one year remission of CD.

**Materials and methods:** Retrospective cohort of 108 patients diagnosed with CD between 1987 and 2014 at a tertiary endocrinology service. Patients underwent clinical and metabolic evaluation at diagnosis and after CD treatment. CD remission criteria after transsphenoidal surgery were: cortisol < 3 mcg/dl on the 1mg-overnight test, normal urinary free cortisol and/or adrenal insufficiency with GC dependence for 6 months. DM resolution criteria were HbA1c <6.5% and fasting glucose < 126mg/dL without antidiabetic drugs.

**Results:** Patients clinical and biochemical features are presented in Figure 1. Of the 108 CD patients, 38% had DM diagnosis and 32% were treated with hypoglycemic agents and/or insulin. CD remission was achieved in 73% of the diabetic patients and 66% were also considered cured of DM after 1 year (p=0.378). There was no statistically significant association between age, gender, body mass index, lipid profile, 24h-UFC at diagnosis and DM regression.

**Discussion:** In this representative CD sample, prevalence of DM was consistent with literature, ranging from 30-50%. Only a few reports analyze DM persistence after CD resolution and possible cure predictors. No relationship was found between DM and CD short term remission. Dysglycemia may persist up to 5 yrs. after CD treatment, showing a metabolic imprinting of chronic GC excess. DM resolution also depends on the weight loss, physical activity, body composition and prolonged use of GC following surgery.

**Conclusion:** DM affects up to 40% of patients with CD and its short term remission does not seem to predict the resolution of diabetes, perhaps because metabolic effects persists even after correction of hypercortisolism and factors associated with DM cure are heterogeneous.

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**Clinical features of diabetes mellitus in hereditary pancreatitis**

Marcio Garrison Dytz, Pedro Arthur Hamamoto Marcelino, Ana Luiza Campanholo*, Isabella Albuquerque Pinto Rebello, Flavia Lucia Conceição, Tânia Maria Ortiga-Carvalho, Lenita Zajdenverg, Melanie Rodacki

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A107

**Background:** Hereditary pancreatitis (HP) is a rare autosomal dominant disease characterized by recurrent acute pancreatitis that progresses to chronic pancreatitis. Common clinical manifestations are abdominal pain, disabsorptive syndrome due to exocrine dysfunction and diabetes mellitus (DM) due to damage to islet cells.

**Objective:** To describe the characteristics of DM secondary to HP in a family with mutation in PRSS1 gene.

**Materials and methods:** Patients of one family with DM secondary to HP due to N29T mutation in exon 2 of the PRSS1 gene were evaluated by review of medical records and download of CG from Accuchek Active glucose meter via software Accuchek 360°. Glycated hemoglobin (HbA1c) during the follow up and capillary blood glucose (CBG) in the previous month were analyzed.

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**A107**

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Results: Five patients were included. In 3 patients, the diagnosis of HP preceded that of DM, while in 2 the opposite occurred. The average time between diagnosis of HP and DM was 80±24 months (range: 60-180 months). All patients used insulin. The mean dose was 0.71±0.63 IU/kg (range: 0.27-1.76 IU/kg). In four patients, we observed the use of other drugs (Metformin and glibenclamide) before insulin therapy was started, for a mean time of 46±45 months (range: 4-96 months). No patient presented HbA1c lower than 7%, one patient presented HbA1c between 7% and 9% and 4 patients presented HbA1c higher than 9%. The average home capillary blood glucose was 217.00±69.44, ranging between 145 and 306 mg/dL. The average standard deviation (SD) of capillary blood glucose (SD) was 104.75±15.36, ranging between 94 and 127 mg/dL. The average duration of diabetes was 120.80±80.32 months, ranging between 20 and 228 months. A retrospective follow-up indicated that HbA1c varied widely since DM onset and/or the last 6 yrs., as shown in figure 1. The SD of HbA1c over this period ranged from 1.0 to 3.2 (mean: 2.6%). In 2 patients, diabetic chronic complications (retinopathy and diabetic neuropathy) were observed.

Conclusion: DM secondary to HP may appear before or after the exocrine manifestations of pancreatitis. In this family with mutation in PRSS1 gene, glycemic control was poor and labile, with important glycemic fluctuations. Insulin was necessary in all cases, with a wide dosage variation between the different family members. These data indicate that DM secondary to HP has difficult management. Strategies to improve the glycemic control in affected patients should be pursued.

A108
25Hydroxy-vitamin D status in patients with berardinelli-seip syndrome (congenital generalized lipodystrophy)
Lia Beatriz de Azevedo Souza Karbage, Ana Paula Dias Rangel Montenegro, Luciana Felipe Férre Araújo, Izabella Tamira Galdino Farias Vasconcelos, Virgínia Oliveira Fernandes, Annelise Barreto de Carvalho, Clarisse Moulão Melo Ponte, Catarina Brasil D’Alva, Carla Soraya Costa Maia, Synara Cavalcante Lopes, Marivaldo Loyola Aragão, Carla Antoniana Ferreira de Almeida Vieira,
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A108

Background: Low status of 25-hydroxyvitamin D (25(OH)D) is defined as level< 30ng/mL. Studies indicate high prevalence of hypovitaminosis D at different ages in many regions of Brazil. It is associated with decreased insulin sensitivity and reduced pancreatic β-cell function. Berardinelli-Seip Syndrome (BS) is a rare congenital autosomal recessive disease due to mutations in 4 main genes (AGPAT2, BSCL2, CAV1 and PTRF). It presents lack of metabolically active fat, and ectopic adipose storage in liver and skeletal muscle, impaired metabolism of lipids and carbohydrates, insulin resistance, diabetes mellitus (DM) and dyslipidemia. We did not find in the literature descriptions about levels of 25(OH)D in groups of patients with BS.

Objective: To describe 25(OH)D blood levels and its correlation with insulin, glycosylated hemoglobin (A1c), HOMA-IR and hepatic steatosis in patients.

Materials and methods: Cross-sectional study conducted between 2013 and 2014. We evaluated 13 patients with BS followed at a University Hospital. Blood dosage of 25(OH)D, insulin, A1c, HOMA-IR, abdominal ultrasound and genetic study was made. Associations were tested by Spearman’s rank correlation coefficient.

Results: The results were expressed as median, 25th percentile and 75th percentile for 25(OH)D levels, mean and standard deviation for other variables, 6 patients had DM, 12 hepatomegaly and 4 hepatic steatosis. All patients had severe low leptin levels (1.2±0.3 ng/mL). Four patients showed mutation on AGPAT2 gene, and 6 on BSCL2. The genetic study of 3 patients is in progress. The correlation coefficients between 25(OH)D levels and insulin, A1c, HOMA-IR, DM, and hepatic steatosis were not significant.

Conclusion: In this study there was an unexpected predominance of normal levels of 25(OH)D in patients with BS, which is not an usual finding in Brazilian population nowadays. Some authors hypothesize that high leptin levels impairs the synthesis of 25(OH)D in obese. It may suggest a possible role of leptin deficiency in the 25(OH)D deficiency in BS. Another hypothesis are that excess of subcutaneous fat would sequester vitamin D and that hepatic injury would result in low 25(OH)D synthesis.

A109
Evaluation of the dietary patterns of individuals with type 1 diabetes who use carbohydrate counting at a public health unit in Brasília-DF
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A109

Objectives: To evaluate the eating behavior of individuals with type 1 diabetes (T1D) and the risk of developing chronic complications.

Materials and methods: An analytical cross-sectional study with a convenience sample consisted of 23 individuals with type 1 diabetes, who needed Intensive insulin therapy and were treated at a public health
unit in which carbohydrate counting was used in the treatment. Through interviews, information on socioeconomic data and feeding behavior was obtained. Anthropometric measurements (weight, height and waist circumference) were also taken.

Results: It was found that most individuals of the sample correctly applied the carbohydrates counting method. For the majority of the sample, food intake was found adequate when compared with that recommended by the Dietary Guidelines for Brazilian population (Guia Alimentar para a População Brasileira), in regard to the groups of carbohydrates, vegetables, proteins of animal and vegetable origin, oils and fats. Most of the sample had a daily or a 2 to 4 times a week intake of whole foods. In contrast, consumption of dairy products and fruits was insufficient among most participants. It was found that 39% of the sample had some degree of overweight, as measured by the body mass index, and 43.4% of the sample had a waist circumference higher than the recommended value.

Conclusion: Helping individuals with T1D is essential in maintaining an appropriate body weight and in preventing abdominal obesity. This should be coupled with a balanced diet, which is essential to the treatment in order to minimize long-term complications and aids achieving good glycemic control. It is crucial to offer periodic training to ensure correct application of the carbohydrate counting method.

A110 Insulin secretion pattern in patients with congenital adrenal hyperplasia during the hyperglycemic clamp compared with a control group

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A110

Background: Intratuberine hypertocism and postnatal corticosteroids chronic replacement, which does not mimic the physiological pattern, are characteristic of patients with the classic form of congenital adrenal hyperplasia (CAH) by deficiency of the 21-hydroxylase enzyme (21OHD). Long-term effects studies of this treatment on insulin secretion pattern by pancreatic beta cells are scarce.

Objectives: Evaluate the function of pancreatic β cells and peripheral insulin resistance through the hyperglycemic clamp in patients with the classic form of CAH-21OHD and compare with healthy individuals.

Materials and methods: The hyperglycemic clamp was applied, the gold standard method for evaluating secretory function of pancreatic beta cells.

Results: The patients with CAH-21OHD, showed an increase of insulin resistance and compensatory insulin secretion resulting in normal glucose homeostasis.

Conclusions: Young adult patients with CAH-21OHD have a normal glucose metabolism by functional adaptation of hypersecretory beta cell. Strategies for the maintenance of the physiological adaptive pattern should be developed to ensure long-term normoglycemia in this specific population.

A111 Precocious endothelial dysfunction in patients with congenital generalized lipodystrophy (Berardinelli-Seip syndrome) evaluated by two different methods

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A111

Background: Berardinelli-Seip syndrome (BS) is a rare disease characterized by severe insulin resistance and absence of subcutaneous fat since birth or early childhood. This condition Results in lipids’ ectopic deposit (muscle, liver and arterial walls), which explains its clinical complications as diabetes, hepatic injury, hyperlipidemia and premature atherosclerosis.

Objectives: To evaluate endothelial function with the flow-mediated dilatation of the brachial artery (FMD) and peripheral arterial tonometry (ENDOPAT) in patients with BS.

Materials and methods: A cross-sectional study with 11 patients with BS and 14 healthy individuals. They performed clinical evaluation, laboratory exams and FMD evaluation. The BS group also performed EndoPAT evaluation. The data were analyzed in STATA 11.2.

Results: There was no difference in age and gender between the groups. After adjusted for sex, age and height, BS group had high blood pressure in 88.89%; hypertriglyceridemia in 69.23%; low HDL-c in 84.62% and hypercholesterolemia in 25% of the subjects. Left ventricular hypertrophy was observed in 40% of the BS group and 50% of BS patients had diabetes. Comparing BS group with control group were observed, respectively, mean systolic BP (mmHg): 127±23.63 vs 102.21±13.40 (p=0.002), diastolic BP (mmHg): 78.11±16.48 vs 63.21±5.23 (p=0.002), BMI (kg/m²): 18.94±2.50 vs 19.93±3.27 (p=0.379), the body fat percentage at bioelectrical impedance analysis (%): 8.56±3.53 vs 24.5±7.67 (p=0.000), fasting plasma glucose (mg/dL): 109.14±78.60 vs 82.42±10.67 (p=0.713), total cholesterol (mg/dL): 192.46±151.64 vs 303.33±179.83 (p=0.023), HDL-c (mg/dL): 29.8±4.87 vs 42.14±11.45 (p=0.004), LDL-c (mg/dL): 80.82±28.04 vs 90.21±23.29 mg/dL (p=0.125), triglycerides (mg/dL): 188.08±168.09 vs 80.57±38.39 (p=0.003). Endothelial dysfunction by FMD was presented in 81.8% of the BS group vs. 30.77% in control group (p=0.012). The prevalence ratio was 2.86 (confidence interval: 1.19-6.86). Endothelial dysfunction by EndoPAT was observed in 50% of the subjects with a natural logarithm reactive hyperemia index (LnRHI index) of 0.49±0.15. There was a mild agreement between the diagnosis of endothelial dysfunction assessed by FMD and EndoPAT (kappa: 0.40, p=0.056).

Conclusion: The results showed that patients with BS presented endothelial dysfunction, even in early ages. It shows the necessity of early intervention in patients to avoid cardiovascular outcomes.

DIABETES, OBESITY AND METABOLIC SYNDROME

A112 Peripheral polyneuropathy in severely obese patients with metabolic syndrome but without diabetes: association with high blood pressure, bmi and low HDL-cholesterol

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A112

Background: Peripheral polyneuropathy (PPN) related to diabetes has been reported in association with causal factors such as obesity, hypertriglyceridemia, systemic arterial hypertension (SAH) and metabolic syndrome (MS), changes which frequently precede diabetes. To evaluate the prevalence of PPN in subjects with grade 2 and 3 obesity with MS without diabetes and to investigate for possible associating factors.

Materials and methods: A cross-sectional study performed with grade 2 and 3 obese subjects with MS and without a diagnosis of diabetes using the Michigan Neuropathy Screening Instrument (MNSI) to assess the presence of PPN. Results: A total of 46 of 218 obese patients grade 2 and 3 with MS and without diabetes had PPN. From the variables studied, SAH (p=0.003), mean blood pressure (MBP) (p<0.001), low HDL-cholesterol (p=0.011), serum levels of HDL-cholesterol (p=0.048), BMI (p=0.036) and waist circumference (p=0.035) were significantly associated with PPN. There was a tendency for serum triglyceride levels (p=0.107) to associate with the presence of PPN. After multivariate regression, SAH, low HDL-cholesterol, BMI and waist circumference remained independently associated.

Conclusion: Low levels of HDL-cholesterol, hypertension and increase of BMI and waist circumference are associated with PPN defined by the MNSI in patients with severe obesity and metabolic syndrome but without diabetes.
**A113**

**Marker of endothelial dysfunction may improve the early detection of insulin resistance and subclinical atherosclerosis**

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*Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A113

**Background:** Cardiovascular disease is still the leading cause of disability and adjusted life yrs. in many developed and developing countries. Better identification of at-risk individuals is still pursued to improve preventive strategies.

**Objective:** This study evaluated whether determination of E-selectin concentrations could identify gradual deterioration of cardiometabolic risk profile or subclinical atherosclerosis in individuals at low-to-moderate risk included in the Brazilian Longitudinal Study of Adult Health – ELSA-Brasil.

**Materials and methods:** A sample of 998 individuals from the ELSA-Brazil (35-54 yrs.) without cardiovascular disease or diabetes was stratified according to E-selectin tertiles. Traditional risk factors, inflammatory markers and categories of coronary artery calcium (CAC) score were evaluated across the tertiles by ANOVA or chi-squared test. In linear regression models, associations of E-selectin levels with insulin resistance index, adjusted for age, sex and adiposity were tested.

**Results:** The mean age of the participants was 45.8 (SD±4.9) yrs. and 55% were women. Mean values of age, anthropometric data, biochemical variables and inflammatory status (assessed by IL-6/IL-10 and TNF-α/IL-10) increased across E-selectin tertiles. Also, a gradual deterioration of the cardiometabolic profile was reflected by increments in frequencies (95% CI) of BMI ≥25 kg/m² [53.7%(48.5-58.8), 61.0%(56.1-66.5) and 64.2% (59.6-69.4), p=0.019], hypertension [18.0%(14.1-22.8), 19.8%(15.4-24.6) and 24.8%(20.4-29.9), p=0.048], pre-diabetes [62.5%(57.4-68.3), 63.1%(58.4-69.6) and 73.8%(68.8-78.3), p=0.003] and hypertriglyceridemia [22.4%(17.9-27.2), 27.3%(22.5-32.8) and 33.4%(28.3-38.5), p=0.013]. Insulinemia and HOMA-IR were independently associated with E-selectin concentration. A greater proportion of individuals with CAC score different from zero was found in the third tertile when compared with the first and second tertiles (16.1% versus 11%, p=0.04, respectively).

**Conclusions:** Direct associations of E-selectin with traditional risk factors slightly above their normal ranges, components of the metabolic syndrome, insulin resistance and CAC score different from zero suggest that this biomarker may be indicating initial atherogenic process.

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**A115**

**Accuracy of insulin resistance indices for metabolic syndrome in a population with different degrees of glucose tolerance**


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*Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A115

**Background:** Insulin resistance has been associated with the development of metabolic syndrome (MS), which is an interrelated cluster of risk factors for cardiovascular disease and type 2 diabetes (T2D). Several equations derived from the oral glucose tolerance test (OGTT) have been developed as surrogates for the euglycemic hyperinsulinemic clamp technique to estimate insulin resistance and insulin sensitivity.

**Objectives:** To determine the accuracy of insulin resistance (IRI) and the reciprocal of insulin sensitivity (ISI) indices to identify MS.

**Materials and methods:** In a cross sectional study, subjects (n=183, females 73.2%; white color 82%; age 52±6.12; 0 means ±SD) were submitted to a 2-h 75g OGTT (58 with normal glucose tolerance, 79 with prediabetes, 46 with T2D; ADA criteria). MS was classified according to IDF criteria (MS n=140, 76.5%). Glycosylated hemoglobin, adiponectin and lipid profile were tested. IRI was estimated by fasting insulin, fasting insulin/fasting glucose and 2h-insulin/2h-glucose ratios, FRI, HOMA-AD, HOMA-IR, HOMA-2-IR and by the reciprocal of adiponectin, Aivignon, Bennet, Gutt, HOMA-2-IR, ISI, IGI 2h, Matsuda, McAuley, QUICKI, Raynau, Stumvoll and OGIS indices. The accuracy of IRI to identify MS was determined by ROC curve analysis and the identification of an optimal cut point was based on Youden index and distance to (0,1). It was considered p<0.001 for significant statistical differences in ROC curves comparison and p<0.05 in further analysis.

**Results:** FRI, HOMA-AD, HOMA-IR and the reciprocal of Aivignon, Bennet, ISI, OGIS and QUICKI indices were directly related with fasting and 2h-plasma glucose, glycosylated hemoglobin, triglycerides levels, systolic and diastolic blood pressure (BP), waist circumference and body mass index, but they were inversely related with HDL-cholesterol. The reciprocals of Stumvoll and Gutt indices were also related with these variables, but not with diastolic BP. ROC analysis showed that the area under the curve was greater for 1/Gutt (0.864), 1/OGIS (0.828) and 1/Matsuda (0.790). By using an optimal cut point of 0.2680, 1/Gutt presented 86.4% sensitivity, 76.7% specificity, and a respective positive and negative likelihood ratio of 3.71 and 0.18 for MS.

**Conclusion:** The reciprocal of the Gutt ISI was the most accurate method for assessing insulin resistance in a sample with a significant prevalence of MS and may be the preferred equation to estimate insulin sensitivity in subjects with MS.

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**A116**

**Nutritional assessment of metabolic syndrome patients with hypopituitarism secondary to pituitary adenomas**

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*Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A116

**Background:** Hypopituitarism, a condition in which the pituitary gland does not produce one or more of its hormones, may cause increased visceral fat deposition, dyslipidemia and decreased muscle mass. Metabolic syndrome is highly prevalent in hypopituitarism, being a complex disorder consisting of metabolic abnormalities, such as central obesity, dyslipidemia, hyperglycemia and hypertension.

**Objective:** We performed clinical, laboratory and nutrition assessment in patients with hypopituitarism, pituitary adenomas and metabolic syndrome, attending a tertiary clinic in southern Brazil.

**Materials and methods:** This was a cross-sectional study of 36 outpatients, aged 20-75 yrs., with metabolic syndrome whose diagnosis was established based on the International Diabetes Federation (IDF) criteria and hypopituitarism, in the presence or after pituitary adenoma treatment. In the anthropometric assessment the body weight, height, body mass index (BMI) and waist circumference were measured. Furthermore, serum lipid levels and fasting glucose were measured. Nutritional assessment included sociodemographic information, history of diseases, use of medications as well as food intake by a 24-h food recall which was evaluated according to the Brazilian guidelines for metabolic syndrome.

**Results:** Nineteen women and 17 men were studied, aged 29-73 yrs. (56.9±9.6), 21 of them presented clinically non-functioning pituitary adenoma, 9 prolactinoma, 4 somatotropinoma, and 2 adrenocorticotropinoma. With respect to hypopituitarism, 28 patients presented panhypopituitarism and 8 isolated hormone deficiency. Mean body mass index was 32.9±5.9kg/m², 67% of subjects were obese and 33% overweight. Waist circumference was increased in 17.6% and high in 82.3% of men, and increased in 10.5% and high 84.4% in of women. Food intake was characterized by low intake of energy and fiber, adequate intake levels of carbohydrate and fat, and high intake of proteins. Also, patients presented increased levels of plasma cholesterol, triglyceride and glucose.

**Conclusions:** In this study, nutritional assessment showed that most patients with hypopituitarism and metabolic syndrome presented class I obesity, and high waist circumference. Also, food intake was characterized by energy and fiber intake below recommended values, adequate in carbohydrate and fat content, and high in protein. When faced these findings, some changes in lifestyle are recommended, including adequate diet and regular physical activity.
A117
Insulin response in peripheral tissues in animals chronically treated with aqueous extract of Hibiscus sabdariffa L.

Background: In 21st century, observed changes in dietary and nutritional standards, such as high consumption of carbohydrates and lipids, lead to an increased search for effective alternatives to treatment of metabolic disorders associated with this type of diet.

Objective: To evaluate the effects of aqueous extract of Hibiscus sabdariffa L. (HS) by chronic treatment on the ability of peripheral tissues to promote glucose uptake in experimental animals with mild hyperglycemia.

Materials and methods: Male Wistar rats were primary divided into two groups: Control (C) received standard chow and water ad libitum; Fructose (F) received standard chow and water containing 7% of fructose ad libitum. At 90 days of age they were one more time re-divided into 4 groups: Control treated with water (C, n=7); Control treated with HS (CHib, n=6); Fructose treated with water (F, n=8); Fructose treated with HS (FHib, n=9). Treatment with HS was daily for 4 weeks at a dose of 800 mg/kg. After treatment period, all rats were submitted to insulin tolerance tests (ITT) with two types of insulin (intermediary and short acting) in order to assess the peripheral tissues in response to the action of insulin. Data obtained was estimated glucose uptake index (GUI). All data statistically analyzed with 5% significance.

Results: ITT performed with insulin NPH (intermediary) show that only C group decreased glycaemia at timepoint 15′ compared to fasting glycaemia (0′). The analyses between groups shows that CHib animals increased at timepoint 15′ and F group decreased at fasting and 5′ timepoints. The GUI data showed that F group had lowered the glucose uptake capacity compared to C group. The ITT performed with insulin Lispro (short acting) showed that CHib group decreased glucose concentration at timepoint 15′. On the other hand, F and FHib groups decreased in 10′ and 15′ compared to its fasting glycaemia. Evaluations between groups shows the CHib rats lowered the serum glucose at 15′, F rats decreased at timepoints 5′, 10′ and 15′ and finally the FHib rats decreased this biomarker at 10′ and 15′. GUI data for Lispo ITT shows the treatment improvement treated the glucose uptake when compared to control rats.

Conclusions: The type of time action of insulin may influence the peripheral tissue responses, inducing glycaemic changes in the groups that received fructose, promoting more sensitivity to insulin Lispro action in these groups, which differs from what observed when used insulin NPH.

A118
Nutritional intervention in patients with hypopituitarism secondary to pituitary adenomas with metabolic syndrome

Background: The deficiency in the production of any of the pituitary hormones, denominated hypopituitarism, may cause the increase of visceral fat, dyslipidemia and decrease of muscle mass. Metabolic syndrome (MetS) is a complex disorder, characterized by alterations of the lipid profile, abdominal obesity, blood pressure and insulin resistance, being highly prevalent in hypopituitarism.

Objectives: We performed clinical, laboratory and nutritional assessment in patients with hypopituitarism, pituitary adenomas and MetS, before and six months post nutritional intervention and compared outcomes.

Materials and methods: This was a cross-sectional study of 36 outpatients, aged 20-75 yrs., with MetS whose diagnosis was established based on the International Diabetes Federation criteria and hypopituitarism, in the presence or after pituitary adenoma treatment. In the anthropometric assessment the body weight, height, body mass index (BMI) and waist circumference (WC) were measured. Furthermore, serum lipid levels and fasting glucose were measured. Nutritional assessment included sociodemographic information, historic of diseases, medications as well as food intake by a 24-h food-recall. These were evaluation prior and post nutritional intervention, on initial visit (V0) and final visit (V6) after six months.

Results: Nineteen women and 17 men were studied, aged 29-73 yrs. (56.9±9.6), 21 of them presented clinically non-functioning pituitary adenoma, 9 prolactinoma, 4 somatotropinoma, and 2 adreno-corticotropinoma. With respect to hypopituitarism, 28 patients presented panhypopituitarism and 8 isolated hormone deficiency. Mean body mass index on V0 was of 32,9±5,89 kg/m² and 50% with class I obesity, on V6 was of 31,8±5,8 kg/m² and 44,4% with class I obesity. After nutritional intervention, patients presented a decrease in weight, BMI and WC (p=<0.001). Food intake was characterized by low intake of energy and fiber, adequate intake levels of carbohydrate and fat, and high intake of proteins on pre and post intervention. After intervention, there was a decrease on total cholesterol (p=0.014) and LDL cholesterol (p=0.030), with cholesterol levels, coming to normal.

Conclusions: Nutritional intervention in patients with hypopituitarism, pituitary adenomas and MetS proved to be effective, leading to decreased anthropometric parameters of weight, IBM, WC, as well as biochemical parameters of total and LDL cholesterol.

A119
The relationship between plasminogen activator inhibitor-1 and type 2 diabetes: a systematic review and meta-analysis

Background: An emerging body of evidence has implicated plasminogen activator inhibitor-1 (PAI-1), a key regulator of the fibrinolytic system, in the development of type 2 diabetes (T2D), though findings have not always been consistent.

Objectives: We systematically reviewed epidemiological studies examining the association of PAI-1 with T2D.

Materials and methods: EMBASE, PubMed, Web of Science, and the Cochrane Library were searched by two independent reviewers for all relevant studies published from 1945 to October 2014. Studies were included if they met all of the following inclusion criteria: 1) Prospective or retrospective cohort study, case-cohort, case-control design, or cross-sectional study; 2) Measurement of plasma PAI-1 (antigen concentrations or activity levels); 3) Assessment of T2D (self-reported physician diagnosis and/or medication usage and/or laboratory diagnosed); 4) Adult study population (≥18 yrs.) at baseline, and 5) Article was reported in English. Prospective studies were pooled using a random-effects model to generate summary RRs and 95% CIs.

Results: 49 studies (41 cross-sectional with 44 unique analytical comparisons and 8 prospective) were included. Out of 44 cross-sectional comparisons, 33 (75%) reported significantly elevated PAI-1 among diabetes cases versus controls, 2 (5%) reported significantly elevated PAI-1 among controls, and 9 (20%) reported null effects. In pooled random-effects analyses of prospective studies including 8612 participants and 932 incident diabetes cases, a comparison of the top third versus bottom third of baseline PAI-1 values generated a RR of T2D of 1.68 (95% CI 1.29-2.18) with moderate heterogeneity (I2=37%). These results did not differ substantially by study design (prospective cohort or nested case-control), length of follow-up (≥ or < 5.7 yrs.), or adjustment for measures of insulin, glucose, visceral adiposity, or inflammatory markers, and were robust to sensitivity analyses. Visual inspection of funnel plots and Results from Begg’s and Egger’s tests suggested absence of publication bias.

Conclusions: Findings from this systematic review of the available epidemiological literature support a link between PAI-1 and T2D. Pooled effects from 8 prospective studies suggest that elevated PAI-1 levels predict incident T2D, independently of established diabetes risk factors. Given the moderate size of the association and heterogeneity across studies, future prospective studies are warranted.
A120

Telmisartan, when compared to losartan, shows additional beneficial effects to pancreatic islet structure and function in diet-induced obese mice
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Background: In animal studies, telmisartan elicits weight loss by activation of the peroxisome proliferator-activated receptors (PPARs), besides blocking AT1-r downstream effects. The effects of telmisartan upon pancreatic islets remain to be unraveled.

Objective: We sought to evaluate the effects of telmisartan (AT1-r blocker and PPAR agonist) or losartan (pure AT1-r blocker) on pancreatic islet structure and function in a diet-induced obesity mouse model.

Materials and methods: C57BL/6 mice were fed a standard Chow (SC; 10% lipids) or a high-fat diet (HF; 50% lipids) for 10 weeks. Then, animals were randomly allocated into six groups to start the treatment with Telmisartan (T) or Losartan (L): SC, SC-L, SC-T, HF, HF-L and HF-T. The treatment phase lasted 5 weeks. Pair feeding (PF) groups were carried out to telmisartan treated groups (SCT-PF and HFT-PF) so as to isolate the effects of the treatment from the effects of reduced diet intake upon the evaluated parameters. Differences among the groups were tested with One-way ANOVA and Holm-Sidak post hoc test (P<0.05).

Results: HFT had lower energy intake and body mass (BM) at the end of treatment than HF and HFL. HFL group had energy intake and BM similar to HF. HFT-PF revealed that BM reduction in HFT can be exclusively attributed to telmisartan as HFT-PF ate the same amount of food as HFT, but did not exhibit reduced BM in comparison to untreated HF. HFT group showed reduced fasting glucose levels when compared to HF, which was not found in HFL group. However, regarding oral glucose tolerance test, and insulin levels, both parameters were improved by telmisartan and losartan when compared to HF. Regarding pancreatic islet architecture and function, HFT and HFL groups had smaller islet mass and β-cell mass than HF. The same behavior was observed for α-cell in both treated groups. However, HFT showed the smallest values of α-cell, with no difference to SC. Interestingly, a qualitative increase in islet vasculization from both treated groups was observed after alpha-smooth muscle actin immunostaining in confocal microscopy.

Conclusions: Telmisartan treatment yielded improvement in all metabolic parameters, besides beneficial pancreatic islet remodeling and function, suggesting that PPAR activation may mediate these additional effects when compared to losartan. Enhanced blood flow to the islets might also be implicated in amelioration of islet structure and function in obese treated mice.

A121

GW501516, a PPAR-BETA/DELTA agonist, improves inflammatory pathways in the kidney of high-fructose fed mice
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A121

Background: Angiotensin-II type 1 receptor (AT1r) high activation is closely linked to a low-grade inflammation and oxidative stress that yield impaired renal function and, consequently, chronic kidney disease (CKD).

Objectives: Therefore, the aim of this study was to verify if GW501516 could improve damage in the kidney of mice with high activation of AT1r.

Materials and methods: To induce high activation of this receptor, mice were fed a high-fructose diet for eight weeks. The control group only received standard-chow (SC). After, the animals were randomly divided into four groups and the administration of GW501516 started and lasted three weeks. Morphological variables and urinary and plasmatic determinations were assessed. Renin and angiotensin converting enzyme (ACE)/AT1r axis protein and gene expression were evaluated as well as inflammatory cytokines and proteins. Also, the protein and gene expression of the antioxidant enzymes were verified.

Results: GW501516 activated PPAR-beta/delta and its target genes PKD4 and CPT-1. Despite showing no effects either on ACE/AT1r axis or renin expression, GW501516 improved the inflammatory state in the kidney. It elicited an expressive reduction in the expression of inflammatory genes such as IL-1β, IL-6, MCP-1 and CD68, irrespective of AT1 downregulation. However, no differences were found in oxidative stress.

Conclusions: We conclude that GW501516, a PPAR-beta/delta agonist, acts downstream AT1r activation, improving inflammatory pathways in the kidney of high-fructose fed model.

A122

Association between akkermansia and escherichia abundances and glucose metabolism parameters in the gut microbiota of Brazilians
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Background: Human body harbors ten times more bacteria than human cells, indicating that microbial communities should play a role for health and diseases. Changes in gut microbiota composition can alter gut barrier, lipopolysaccharides (LPS) translocation and trigger metabolic endotoxemia and insulin resistance. Akkermansia has been associated with a protective effect on the gut barrier by increasing mucus layer. In contrast, Escherichia is a gram-negative bacterium that contains LPS on your surface.

Objectives: We compared the abundance of Akkermansia and Escherichia in the gut microbiota of individuals stratified according to glucose tolerance and tested associations of their abundances with several biomarkers.

Materials and methods: This cross-sectional study included 295 individuals divided into normal and abnormal glucose tolerance groups. Abnormal group was defined by the presence of impaired fasting glucose, impaired glucose tolerance or diabetes. The molecular profile of the fecal microbiota was obtained by sequencing V4 region of 16S rRNA gene (illumina*Miseq). For the purpose of the present analysis, only individuals with biologically significant levels of Akkermansia (>1%) were included in the correlation analyses (N=94).

Results: From 295 (54.2% women; 49.5±8.4 yrs.; 25.1±4.5 kg/m²), 188 showed normal and 107 abnormal glucose tolerance. As expected, mean values of BMI, plasma glucose, glycated hemoglobin, HOMA-IR and CRP were lower in the normotolerant group (p<0.05). Akkermansia abundance was inversely correlated to CRP and HOMA-IR (r=0.219 and r=0.208, p=0.017 and p=0.022, respectively), while the Escherichia abundance showed significant positive correlations to IL-6, CRP and HOMA-IR (r=0.215, r=0.349 and r=0.248; p=0.019 and p<0.001 and p=0.008, respectively).

Conclusions: The associations of Akkermansia and Escherichia abundances respectively with favorable and unfavorable metabolic profile could suggest a role of those genus in glucose metabolism. This cross-sectional design precludes establishing cause-effect relationship. Intervention studies are needed to investigate the potential of Akkermansia for the prevention of obesity-related disorders.

A123

Timing and type of alcohol consumption and the metabolic syndrome: ELSA-Brasil
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A123

Background: The prevalence of the metabolic syndrome is rising worldwide. Its association with alcohol intake is controversial, and data is
sparse concerning the influence of drinking during, as opposed to outside of meals.

Objective: We aimed to investigate the associations of different aspects (quantity, predominant beverage and moment of consumption) of alcohol consumption with the metabolic syndrome and its components.

Materials and methods: In cross-sectional analyses of 14570 individuals who participated in the ELSA-Brasil baseline, we fitted logistic regression models to investigate interactions between the quantity of alcohol, predominant beverage type (wine, beer or other), and principal moment of consumption with respect to meals in the association of alcohol consumption with the metabolic syndrome.

Results: In analyses adjusted for sex, age, skin color/race, smoking, body mass index, educational level, per capita income and socioeconomic class, light consumption (up to 4 doses/week), predominantly of wine and with meals was inversely associated with the metabolic syndrome (OR=0.69, 95%CI 0.57 – 0.84), elevated fasting glucose (OR=0.83, CI95% 0.70 – 0.99), elevated waist circumference (OR=0.65, CI95% 0.51-0.84) and reduced HDL-cholesterol (OR=0.63 95%CI 0.50 – 0.79), compared to abstention/occasional drinking. Drinking predominantly wine, regardless of the moment of consumption, was never significantly associated with higher odds of any component of the syndrome. On the other hand, greater consumption of alcohol (>7 doses/week), predominantly as beer, when mainly consumed outside of meals was significantly associated with the metabolic syndrome (7 to 14 doses/week: OR=1.43, 95%CI 1.18 – 1.73; more than 14 doses/week: OR=1.70, 95%CI 1.35 – 2.15) and with syndrome components, except for low HDL-cholesterol.

Conclusion: The association of alcohol consumption with the metabolic syndrome and many of its individual components differed markedly by predominant beverage and the consumption’s relationship to meals. Protective associations were generally seen when consumption was with meals and in smaller quantities, and when it was wine; risk associations were generally seen with greater quantities and consumption outside of meals.

A124
Gain weight and sleep desynchronization in workers of a tertiary hospital
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Background: The effects of night work or shift work on workers’ health are unknown, recent findings have indicated that may affect glucose tolerance, lead to obesity, diabetes and metabolic syndrome (MS). The desynchronization of the circadian cycle has been related to some of these effects, as well as sleep deprivation and exposure to light at night.

Objectives: To study the association between shift work and chronic diseases and quality of life among health professionals of a university hospital and compare workers day and night shifts in relation to metabolic changes and altered sleep pattern.

Materials and methods: Cross-sectional study conducted between April 2013 and December 2014. Sociodemographic data were evaluated and for the quality of life we used the WHOQOL BREF. Cronotimes and daily preferences sleep were investigated by Chronotype Questionnaire Munich (MCTQ). Sleep quality was assessed by questionnaire Pittsburgh Sleep Quality Index. Physical examination was performed and venous blood was collected in fasting for 12 h for laboratory analysis.

Results: 129 women and 49 men were included, 108 of the day shift and 21 of the night shift. In cross-sectional analyses of 14570 individuals who participated in the ELSA-Brasil baseline, we fitted logistic regression models to investigate interactions between the quantity of alcohol, predominant beverage type (wine, beer or other), and principal moment of consumption with respect to meals in the association of alcohol consumption with the metabolic syndrome.

Conclusion: The association of alcohol consumption with the metabolic syndrome and many of its individual components differed markedly by predominant beverage and the consumption’s relationship to meals. Protective associations were generally seen when consumption was with meals and in smaller quantities, and when it was wine; risk associations were generally seen with greater quantities and consumption outside of meals.

A125
Study of Duguetia furfuracea aqueous extract treatment in metabolic profile and renal fuction biomarkers of obese Wistar dams
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Study of Duguetia furfuracea aqueous extract treatment in metabolic profile and renal function biomarkers of obese Wistar dams
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Study of Duguetia furfuracea aqueous extract treatment in metabolic profile and renal function biomarkers of obese Wistar dams
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Background: Obesity is a pathophysiology condition that influences the metabolic pathways, and the association with pregnancy can worsen the lipidic and glycemic profiles. Moreover, Duguetia furfuracea has been used for obesity and also kidney disease treatment, however a very few studies have been conducted to verify its effectiveness and safety for using as well as to evaluate its influence on metabolic profile.

Objective: To evaluate the biomarkers for metabolic profile and renal function of aqueous extract treatment of D. furfuracea in obese Wistar dam rats.

Materials and methods: Ten newborn female Wistar rats were used, were administrated monosodium glutamate solution, 4.0 mg/Kg body weight (obese) in neonatal period. At adult age (90 days of life) these female rats were mated with healthy male rats and after offspring weaning period, the dams were used and divided into two groups: control (CONT; n=05) daily treated with water; and experimental (DF n=05) daily treated with aqueous extract of D. furfuracea at a dose of 200 mg/Kg, both treatment for 28 days. Lee Index for obesity classification was measured in first and last day of experimental protocol, and weekly it was measured body weight, blood glucose, urine flow, fecal weight, and food and water consumption. At 28th day of treatment, all rats were anesthetized and killed by decapitation and thus serum biomarkers were measured (total protein, cholesterol and its fractions (HDL, LDL and VLDL), triglycerides and liver transaminases (ALT and AST)). Moreover, several organs were collected (liver, kidney and periovian fat) and also performed their relative weight. Statistical significance was p <0.05.

Results: Obesity was confirmed by Lee index, showing higher values of 0.300, demonstrating the success of obesity induction method. Food intake was increased in days of treatment 7, 14, 21 e 28 in CONT dams, compared to first day (zero). When both groups were compared, the DF dam rats presented a higher food intake compared to CONT dams at day 0. The other parameters did not presented changes during all experimental period, nor the biochemical evaluations.

Conclusion: The dose used in treatment of D. furfuracea in experimental obesity did not change the metabolic profile, nor presented alteration in renal function. Moreover, it did not any present toxic effect.

A127
Effect of maternal obesity on insulin action in male adult offspring rats
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A127

Background: Obesity is a metabolic disturbance that more affects the population in 21st century. Among these metabolic changes, the glucose intolerance and insulin resistance may be developed by aging and also influence in further generations.

Objective: to evaluate the secretion and action of endogenous insulin in adult age of rats from a gestational obesity.

Materials and methods: Twelve newborn female Wistar rats were used, and half of them submitted to saline solution administration (control) and the other half were administrated monosodium glutamate solution, 4.0 mg/Kg body weight (obese) in neonatal period. At adult age (90 days of life) these female rats were mated with healthy male rats and the male offspring were used, divided into two groups: control (CONT, n=29) and obese (OB, n=19), according to its previous dam group. In all adult age (from 3rd to 7th months) the rats were monthly evaluate the Lee Index, water and food intake, 12-h-fasting glyceremia, oral glucose tolerance test (OGTT) and insulin test tolerance (ITT). In addition, from OGTT Results it was estimated the area under the glycemic curve (AUC). All data were statistically analyzed with 5% significance.

Results: 20% of CONT rats were classified as obese by Lee Index only in 7th month, whereas 100% of OB rats were classified as obese. Moreover, the OB rats showed increasing of food intake at 4th and 7th month and water intake in 4th month. CONT rats presented higher food intake from 5th to 7th months, all compared to 3rd month. When both groups are compared, OB rats presented an increased food intake in months 3 and 4. In both groups the 12h-glyceremia were higher only in 7th month. The OGTT data showed a progressive disturbance in glycemic curve, once in the 3rd and 4th months the curves presented a classic design (glycemic timepoints higher in 30’ and decreasing at 60’ and 120’), at 5th month the serum glyceremia increased at timepoint 30’ in both groups and in 6th month only in OB group. In the last month, the OB group presented higher glyceremia in all timepoints in OB rats, and the ITT presented no insulin effect, because all timepoints did not presented glucose changes.

Conclusion: The gestational obesity has the ability to induce the obese state to next generation, associated with glucose intolerance and insulin tolerance with aging, suggesting lower insulin effects in peripheral tissues.
Objective: To evaluate the insulin secretion and action profile in adult age of rats from a gestational obesity.

Materials and methods: Twelve newborn female Wistar rats were used, and half of them submitted to saline solution administration (control) and the other half were administrated monosodium glutamate solution, 4.0 mg/Kg body weight (obese) in neonatal period. At adult age (90 days of life) these female rats were mated with health male rats and the female offspring were used, divided into two groups: control (CONT, n=28) and obese (OB, n=15), according to its previous dam group. In all adult age (from 3rd to 7th months) the rats were monthly evaluated with the Lee Index, water intake, food intake and 12h fasting glycemia. The results showed that the percentage of fructose used was similar in all groups regardless of treatment and diet. The additional inclusion of fructose in the diet increased in water intake (months 5 to 7) and food intake (months 4, 6, 7), all compared to 3rd one. The glycemic levels was increased from 5th to 7th in CONT group, whereas it has increased at 6th and 7th months in OB rats, and between groups the female rats presented higher glycemia in months 3, 6 and 7 compared to CONT ones. The insulin tests (OGTT and ITT) in all months of CONT group showed as normal. Therefore, at 7th month in OB group showed glucose intolerance (glucose increasing in timepoints 30’, 60’ and 120’ in OGTT, compared to fasting, with increasing AUC) and insulin resistance (no differences at timepoints 15’, 30’, and 60’ in ITT, compared to fasting).

Conclusion: The gestational period associated with obesity leads glucose intolerance and insulin resistance associated to aging process, confirming the transgenerational effect in female rats with changes of insulin action in peripheral tissues.

A129 Double-diabetes in a real-world sample of 2,711 individuals: associated with insulin treatment or part of the heterogeneity of type 1 diabetes?
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A129

Background: Double diabetes (DD) can describe both individuals with obesity upon diagnosis of type 1 diabetes (T1D) and those who have gained weight during follow-up, although most of the first group has been excluded from classic T1D trials. The interrelation between weight excess and cardiovascular risk factors (CVRF) is not well understood in these individuals.

Objective: To evaluate the frequency of DD in a real-world T1D sample and the interaction of insulin treatment, diabetes duration, weight excess, and CVRF.

Materials and methods: 2,711 individuals with clinical diagnosis of type 1 diabetes from secondary diabetes care centers in 20 Brazilian cities, studied by the Brazilian Type 1 Diabetes Study Group (BrazilDiab15G), had been assessed regarding frequency of obesity according to diabetes duration, insulin dose per body weight according to diabetes duration and BMI status, CVRF according to diabetes duration and BMI.

Results: Patients with diabetes duration < 5 and ≥ 5 yrs. had similar frequency of overweight (20.4 vs 25%) and obesity, (9.6% vs 6.1%), p = 0.28 for trend. Age according BMI status was different among normal weight (N), overweight (OW), and obese individuals (Ob) in both diabetes duration < 5 yrs. (13.5 ± 6.6 vs. 13.1 ± 8.0 vs. 9.8 ± 6.6 yrs. old, respectively, p < 0.001) and diabetes duration ≥ 5 yrs. (24.2 ± 11.5 vs. 26.3 ± 12 vs. 25.2 ± 13.9, respectively, p < 0.001). BMI was similar in all groups regardless of diabetes duration and BMI status. Insulin dose (U/kg/day) was lower in Ob individuals compared to N, with mean (95% CI) 0.62 (0.62-0.83) vs. 0.88 (0.84-0.92) U/kg/day for diabetes duration < 5 yrs. and 0.84 (0.77-0.92) vs. 0.99 (0.97-1.01) U/kg/day for duration ≥ 5 yrs. Ob individuals had lower HDL (47.3 [34.0-51.9] vs. 54.4 [33.0-55.6] mg/dL) and higher non-HDL-cholesterol (134.5 [123.2-145.9] vs. 115.2 [111.6-118.9] mg/dL) than N only among those with more than 5 yrs. of diabetes. Number of insulin applications was not associated with weight excess or diabetes duration.

Conclusions: Lower insulin doses in obese individuals point to a role of clinical heterogeneity of insulin deficiency and sensitivity on the progression of DD. Lower levels of HDL-cholesterol and high number of cardiovascular risk factors are associated with obesity in long duration T1D. These data suggest a broad clinical landscape of pathophysiological phenomena for double diabetes, rather than simple progression of a homogeneous clinical entity.

A130 Changes in cellularity of Wistar rats bone marrow treated with fructose
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A130

Background: Fructose is a monosaccharide and is an important component of our diet. Children and young people consume foods low in nutrients and high in sugar, around 30% daily, drawing attention to the increase in obesity and chronic diseases in populations. During ontogeny, bone marrow supports the formation and development of cells. The functioning of the immune system depends on several nutrients that have important roles in the body, and its deficiency leads to depression of the immune system. It is relevant to study a young animal model before an intake of fructose, standardizing the percentage used and the treatment time.

Objective: The objective of this study was to evaluate the relationship of fructose diet and possible changes in cellularity of bone marrow of Wistar rats.

Materials and methods: Wistar male rats were used. At 42 days of age they were divided in two groups: a) control group (C, n=7), rats that received standard diet and filtered water without addition of other substances b) Group fructose (F, n=8): rats which received standard diet and filtered water with addition of 7% fructose. The animals were weighed weekly. Was analyzed biochemical parameters for monitoring monthly blood glucose. At the end of treatment (day 90) they were sedated and euthanized. Was analyzed the immunological parameters of the bone marrow (bone marrow aspirate, for total cell count (Neubauer chamber) and differential count and myeloid/erythoid lineage. Statistical analysis was done through the Student t test, analysis of variance (ANOVA) and Multiple Comparison Test Dunnett. Values were considered statistically different when p ≤ 0.05.

Results: The animals treated with fructose showed a hypercellular bone marrow with an increase in the erythroid and myeloid lineages (low neutrophils and leucocytosis) and also in myeloid/erythroid lineage. As for monthly blood glucose, the fructose group, there was a significant increase in the first month experiment with decrease in three months, compared to the control.

Conclusion: The results showed that the percentage of fructose used was not sufficient to induce hyperglycemia in animals, but its ingestion resulted in low neutrophils and leucocytosis, hewing that even at low doses fructose caused changes in hematoipoiesis.
acts through a cascade of intracellular signaling that depends on the activation of several proteins, such as Akt. Our hypothesis is that PH domain and Leucine rich repeat Protein Phosphatase 1 (PHLPP1) inhibits Akt activity by dephosphorylating serine 473 residues, impairing the insulin action in the hypothalamus. However, PHLPP1 expression and the role played by it on the hypothalamus of diet induced obesity (DIO) animals are not fully understood.

**Objectives:** To investigate PHLPP1 protein expression in the hypothalamus of DIO rats and to assess whether the PHLPP1 silencing improves insulin action and decreases body adiposity.

**Methodology:** Eight-week-old male Wistar rats were distributed into two groups. One group was fed with standard diet and the other group with high-fat diet, during eight weeks. After this period, the hypothalami of Chow and DIO animals were dissected for analysis of PHLPP1 protein expression. In another experiment, DIO animals were cannulated in the lateral ventricular and received intracerebroventricular (ICV) treatment to silence PHLPP1 expression, or its control, scramble (siRNA-SCR), during 7 days. Body weight and food intake were measured daily. On day 8, fasted animals received an insulin or saline ICV injection and their hypothalamus was extracted after 15 min to evaluate the PHLPP1 expression and insulin pathway proteins. Retropheroideal and epidymidal adipose depots were dissected and weighted.

**Results:** Initially, DIO animals showed increased protein expression of PHLPP1 in hypothalamus compared to the Chow group. After 7 days of ICV treatment with siRNA-PHLPP1, DIO rats showed reduced expression of this phosphatase and led to greater weight loss and reduction in adiposity, epidypidal and perirettonal. Interestingly, hypothalamic PHLPP1 inhibition restored the phosphorylation of Akt in the hypothalamus. Conversely, it was not observed significant changes in food intake and fasting glucose.

**Conclusion:** Hypothalamic PHLPP1 silencing in DIO animals restored, at least in part, the insulin signaling, promoting reduction in body weight and adiposity.

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**A132**

**Profile pressure between hypertensive with and without diabetes**

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**Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A132**

**Background:** The lack of control of diabetes and hypertension contributes to the high rates of morbidity and mortality from cardiovascular disease. Better blood pressure control can effectively reduce such outcomes and reduce micro and macrovascular complications in patients with these comorbidities.

**Objective:** To analyze the control of hypertension in a follow-up cohort of ten yrs. and compare the blood pressure control rates among hypertensive patients with and without diabetes. Materials and Methods: a cross-sectional study of historical cohort of hypertensive/diabetic (GDM) and non-diabetic (GHAS) in regular treatment for at least 10 yrs. in special service for compliance with hypertension. Initial assessment of the cohort in 2004; used variables: gender, race, age, physical inactivity, alcohol consumption, smoking, amount of drugs, levels and control blood pressure, weight and height. For the control of blood pressure among non-diabetic hypertensive patients were considered values <140/90 mmHg and for hypertensive diabetic values <130/80 mmHg. Association analysis of variables with chi-square test and means were compared with Student’s t-test. P<0.05 was significant. Hypothesis was approved by the ethics committee.

**Results:** The study included 126 patients (GDM 69; GHAS 57), with average length of treatment in 2004 of 6.8 yrs. Females were predominantly in both groups (GDM 81.2%; GHAS 77.2%) and also white race (62.5%). The overall mean BMI was 28.9 kg/m2; for GDM average was 30.8 kg/m2 (29.6 to 32.2 95% CI) and the GHAS 26.4 kg/m2 (25.4 to 27.5 95% CI; p <0.001. The overall mean systolic blood pressure was 134.6 mm Hg (95% CI 131.1 to 140.2), and diastolic pressure was 84.1 mmHg (86.4 81.7–95%); no significant difference between groups. The pressure control was unsatisfactory for 68.9% of hypertensive patients with diabetes and hypertension 31.1% without diabetes (p <0.001). The numbers of antihypertensive drugs prescribed was similar between groups; there was no association between the amount of medication and blood pressure control.

**Conclusion:** The presence of diabetes as comorbidity reflected in worse hypertension control rates, even with amount of antihypertensive medication similar. Diabetic hypertensive patients should receive more effective control actions in order to reduce cardiovascular outcomes because their blood pressure goals are stricter.

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**A135**

**Homa-adenopenictin index as useful surrogate marker in the screening of insulin resistance**

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**Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A135**

**Background:** Metabolic syndrome (MetS) comprises pathological conditions that include insulin resistance, arterial hypertension, visceral adiposity and dyslipidemia, which favors the development of cardiovascular diseases and type 2 diabetes. Advanced oxidation protein products (AOPPs) have been reported as the most appropriate parameter for determination of oxidative stress (OS) in MetS patients and are formed during oxidative stress by the action of chloraminated oxidants, mainly hypochlorous acid and chloramines, produced by myeloperoxidase in activated neutrophils.

**Aim:** The objective of the present study was to correlate two biomarkers of OS with metabolic features in MetS patients.

**Materials and methods:** This study evaluated 48 women, aged 32-58 yrs. recruited from University Hospital of Londrina, Paraná, Brazil. The groups were divided according to MetS components in 3 groups, G1 (with 3 components), G2 (with 4 components) and G3 (with 5 components). MetS was defined following the Adult Treatment Panel III (ATP III) criteria. After fasting for 12 h, the subjects underwent the following laboratory blood analysis: glucose, total cholesterol (TC), high density lipoprotein cholesterol (HDLc), low density lipoprotein cholesterol (LDLc), triacylglycerol (TG), uric acid and C reactive protein (CRP) which were evaluated by a biochemical auto-analyzer (Dimension Dade AR, Dade Behring, Deerfield, IL, USA), using Dade Behring kits. Advanced oxidation protein products (AOPPs), as markers of protein damage, total antioxidant capacity (TRAP) as antioxidant were evaluated by the semiautomated method described by Witko-Sarsat et al and chemiluminescence, respectively. Pro-oxidant-antioxidant imbalance (PAI) was calculated divided AOPP/TRAP.

**Results:** The G3 group presented high levels of BMI, WC, serum levels of glucose, CRP, uric acid, AOPP and PAI when compared with G1, whereas TRAP was significantly lower in the G3 group when compared to G1 and G2 groups. G3 also presented high levels of glucose, CRP, AOPP and lower levels of TRAP when compared to G2 group. With regard to the relationship between oxidative stress markers and metabolic syndrome components, there were a positive correlation between AOPP and TG (r: 0.810; p: 0.0002), LDL (r: 0.630; p: 0.015) and CRP (r: 0.593; p: 0.019).

**Conclusion:** This study showed that the metabolic disorders were determinant for the redox imbalance, characterized by increased plasma oxidation and reduced antioxidant capacity.
Background: The major adverse consequences of obesity are associated with the development of insulin resistance (IR) and adiposopathy. The Homeostasis Model Assessment-Adiponectin (HOMA-AD) was proposed as a modified version of the HOMA-IR, which incorporates adiponectin in the denominator of the index.

Objectives: Evaluate the performance of the HOMA-AD compared with the HOMA-IR as a surrogate marker of IR in women, and to establish the cutoff value of the HOMA-AD.

Materials and methods: The BRAMS is a cross-sectional multicenter survey. The data from 1,062 subjects met the desired criteria: 18-65 yrs. old, BMI: 18.5-49.9 kg/m² and non-diabetic. The IR was assessed by the indexes HOMA-IR and HOMA-AD (total sample) and by the hyperglycemic clamp (n=49). Metabolic syndrome was defined using the IDF criteria.

Results: For the IR assessed by the clamp, the HOMA-AD demonstrated a stronger coefficient of correlation (r=-0.64) compared with the HOMA-IR (r=-0.56); p<0.0001. In the ROC analysis, compared with the HOMA-IR, the HOMA-AD showed higher values of the AUC for the identification of IR based on the clamp test (AUC: 0.844 vs. AUC: 0.804) and on the metabolic syndrome (AUC: 0.703 vs. AUC: 0.689), respectively; p=0.0001. However, the pairwise comparison did not suggest superiority for the HOMA-AD in the diagnostic of IR (p=0.05). The optimal cutoff identified for the HOMA-AD for the diagnosis of IR was 0.51.

Conclusions: HOMA-AD was demonstrated to be a useful surrogate marker for detecting IR among adult women and presented a similar performance as the HOMA-IR.

A136
Male gonadal axis assessment in bariatric surgery candidates
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A136

Background: Obesity is increasingly prevalent worldwide and has profound impacts on health and quality of life. It is known that testosterone plays an important role in the pathology of metabolic diseases such as obesity. Although very prevalent, this association is underdiagnosed.

Objective: To evaluate the male gonadal axis in patients with body mass index (BMI) ≥35 kg/m².

Materials and methods: Cross-sectional study, including male patients evaluated for bariatric surgery that had a BMI ≥35 kg/m². Blood samples were collected in the morning, after overnight fasting, and all tests were performed in the same laboratory.

Results: We evaluated 69 subjects, mean age 39±10 yrs. and 87% caucasian. Type 2 Diabetes Mellitus (T2D) was found in 47.8%, hypertension in 72.5%, dyslipidemia in 23.2% and metabolic syndrome according to the IDF in 87%. Mean weight, waist circumference and BMI were respectively: 157±31.0 kg, 148.2±14.9 cm and 51.2±8.3 kg/m². The average fasting glycemia was 111.1±34.7 mg/dL (NR <100), HbA1c 6.5±1.3% (NR <5.7), total testosterone (TT) 232.8±96.9 ng/dL (NR >300), LH 3.1±1.3 mIU/mL (NR 0.8 to 7.6) and calculated free testosterone (CFT) 5.9±2.7 ng/dL (NR 6.5). 79.7% of subjects had TT ≤300 ng/dL and 56.5% CFT ≤6.5 ng/dL. Categorizing patients according to the levels of TT (G1 (≤200 ng/dL): 53.8±8.5 kg/m² x G2 (201-299 ng/dL): 49.3±7.2 kg/m² x G3 (≥300 ng/dL): 48.7±8.7 kg/m²), there was a statistically significant difference only in relation to BMI (p=0.04). There were no statistically significant differences in mean TT and CFT between individuals with and without T2D [TT: 218.8±89.4 x 245.5±102.8 ng/dL (p=0.25); CFT: 5.65±2.7 x 2.65±2.1 ng/dL (p=0.39)].

Discussion/conclusion: The evaluation of our group of patients with BMI ≥35 kg/m² showed a high rate of individuals with TT less than 300 ng/dL. We also identified a statistically significant difference in BMI according to the categorizations of TT, with higher BMI levels in patients with TT ≤200 mg/dL. In this sense, it reinforces the need for gonadal axis assessment in obese patients and their appropriate monitoring and treatment.

A137
Quantitative determination of FAM3D plasma protein in type 2 diabetes mellitus
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A137

Background: Among the new cytokine Family with Sequence Similarity 3 (FAM3), a subfamily of proteins similar to cytokines known as FAM3D was identified. FAM3D is predominantly expressed in the gastrointestinal tract of normal individuals. Plasma concentrations of FAM3D range according to the nutritional status presenting a postprandial increase and a reduction in the later post-absorptive period. It might be speculated that FAM3D is an inhibitor of insulin secretion, as it has been observed a significant increase in patients with pancreatic adenocarcinoma associated with T2D.

Aims: Quantitatively determine the plasma concentration of FAM3D, in a group of patients with T2D and comparing with patients with pre-Type 2 Diabetes Mellitus (pT2D) and Control (CTRL) individuals paired according to gender, age and body mass index in order to better elucidate the physiology of FAM3D as well as its pathophysiological role in T2D.

Materials and methods: We selected 90 patients comprising 15 male and 14 females diagnosed with T2D; 12 male and 15 female diagnosed pT2D;
and 7 male and 9 female CTRL. Seventeen patients were excluded according to the inclusion and exclusion criteria. In total, 73 patients were included. All were submitted to measurement of anthropometric and biochemical tests, including HOMA-IR calculation and the determination of plasma concentrations of FAM3D by ELISA. The Mann-Whitney tests were used in the comparison of study groups, and the regression coefficient P of Spearman was calculated on correlation between plasma concentrations of FAM3D and other anthropometric and biochemical variables. The level of statistical significance was set at p < 0.05.

**Results:** Among the groups there were no significant difference in the FAM3D. Before the DI, the variables did not differ between groups. All anthropometric measurements were included. All were submitted to measurement of anthropometric and biochemical tests, including HOMA-IR calculation and the determination of plasma concentrations of FAM3D by ELISA. The Mann-Whitney tests were used in the comparison of study groups, and the regression coefficient P of Spearman was calculated on correlation between plasma concentrations of FAM3D and other anthropometric and biochemical variables. The level of statistical significance was set at p < 0.05.

**Conclusions:** There was no correlation of FAM3D between groups. Patients with T2D on sulfonylurea presented a higher concentration of FAM3D when compared to T2D patients treated with other oral antidiabetic drugs (14.9 ng/mL ≥ 3.30), p < 0.05.

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**A138**

**Effects of anti-CD4/CD8 antibodies in the recovery of salivary glands in experimental hyperglycemic condition**

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Diabetology & Metabolic Syndrome 2015; 7(Suppl 1):A138

**Background:** Diabetes affects the metabolism, promoting damage in different tissues, including salivary glands. Current treatments, are ineffective to recovery of these tissues. In this aspect, the immunotherapy has been tested, but still remains inefficient as an agent for the control of damage caused by diabetes. In this way, more tests are necessary to conclude the real effects of this therapy.

**Objectives:** Thus, the aim of this study was to evaluate the association in anti-CD4 and anti-CD8 monoclonal antibody in the recovery of salivary glands of diabetic NOD mice.

**Materials and methods:** Fifteen spontaneously diabetic mice (NOD) were divided into three groups with 5 animals each: group I (BaB/C control group), group II (untreated NOD mice), group III (NOD mice treated with anti-CD4/CD8 antibodies). The anti-CD4/CD8 antibodies (IMUNY, Rheabiotech Ltda, Brazil) were administered by intravenously injections (25 μg/days: 0, 7, 14, and 21). After treatment salivary glands samples were analyzed by light microscopy and stereology (ethical approval process: 304/11). Analysis of variance (ANOVA) and Kruskal-Wallis nonparametric test were used.

**Results:** Elevated levels of glucose (mg/dL) were observed in untreated animals (group II) (605.25±31.23 p≤0.05), whereas in treated animals (group III), there was a decrease in these levels (464.77±39.66 p≤0.05). Tissue restructure, characterized by cell volume recovery, also was observed in the group III (nuclear volume of parotid glands: 109.9±1.02 μm² p≤0.05 and in submandibular glands: 107.5±2.05 μm² p≤0.05 and cytoplasmic volume of parotid glands: 356.1±26.34 μm³ p≤0.05 and in submandibular glands: 351.22±32.11 μm³ p≤0.05, respectively).

**Conclusions:** This treatment was effective in the recovery of salivary acinar cells, contributed also to homeostasis of body metabolism. Thus, this immunomodulation promoted a beneficial effect on the recovery of these tissues.

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**A139**

**Effects of unsaturated fatty acids on weight loss, body composition and obesity related biomarkers**

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Diabetology & Metabolic Syndrome 2015; 7(Suppl 1):A139

**Background:** Obesity is multifactorial disease that may be related to the development of comorbidities such as type 2 diabetes mellitus and cardiovascular disease.

**Objectives:** Evaluate the effects of modulation of dietary polyunsaturated fatty acid (PUFA) and monounsaturated fatty acid (MUFA) on weight loss, body composition and obesity related biomarkers.

**Materials and methods:** A parallel, randomized, controlled, single-blind study was conducted with dietary intervention (DI) for 60 days, which 32 women with class I and II obesity were distributed into three following groups: G1:normocaloric diet high in n-3/n-6 PUFA (12% of total energy intake, 10% of n-6 and up to 2% of n-3) (n=10); G2:normocaloric diet high in MUFA (15% to 20% total energy intake) (n=11) and G3=control group with maintenance of habitual diet (n=11). The diets prescribed for G1 and G2 had similar macronutrient composition, varying only the type of fats offered. For complementation of dietary fats were used soy and fish oils to G1 and olive oil to G2, which all groups received capsules and sachets containing oils or placebo. Anthropometric measurements, body composition (bioelectrical impedance analysis) and laboratory variables (glucose, insulin, free fatty acids (FFA), glycerol, adiponectin and leptin) were carried out before and after the DI. The insulin resistance and sensitivity were assessed by HOMA-IR (Homeostasis Model Assessment) and QUICKI (Quantitative Insulin Sensitivity Check Index) respectively.

**Results:** Before the DI, the variables did not differ between groups. All groups had similar caloric and macronutrients intake during the DI, differing only in the quality of dietary fats. G2 decreased body weight (-1.92 ± 1.99 kg), body mass index (-0.69 ± 0.70 kg/m²), waist circumference (-1.91 ± 1.82 cm) and body fat mass (-1.14 ± 1.53 kg). There were no effects on glycemic profile as well as the concentrations of FFA, glycerol, adiponectin and leptin. However, G3 showed increased insulin resistance.

**Conclusion:** Diet high in MUFA promoted benefits on weight loss and body composition in women with obesity. There was no influence of the type of dietary fat in obesity related biomarkers.
Food choices attitudes before and after bariatric surgery. Psychological support 7(Suppl 1): 1.33) vs. 0.70

Our preliminary results suggest that NLRP3 and CGI-58 gene expressions are different between morbid-obese and moderate-obese patients. Moreover, our data indicating that NLRP3 expression is correlated with triglycerides is in agreement with studies showing an effect of diet on NLRP3 regulation.

**A141**
Evaluation of NLRP3 inflammasome expression and its endogenous inhibitor CGI-58 in subjects with different obesity degrees
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**Background:** Obesity is associated with a state of low-grade chronic inflammation, commonly causing insulin resistance (IR) and type 2 diabetes mellitus (T2D). The NLRP3 inflammasome is a key mediator of metabolic inflammation, and it has been shown to be activated in macrophages of newly diagnosed insulin resistant-T2D patients. In humans, reduction in NLRP3 expression in adipose tissue is linked to decreased inflammation and improved insulin sensitivity in obese T2D patients. Recently, it was demonstrated that the lipolytic factor CGI-58 is an endogenous suppressor of NLRP3 activity in animal models. Therefore, the aim of this study was to evaluate CGI-58 and NLRP3 gene expressions in adipose tissue from individuals with different obesity degrees and their association with metabolic variables.

**Methodology:** Subcutaneous adipose tissue was obtained from 35 individuals who undergone bariatric surgery. All individuals underwent a clinical and laboratory evaluation after signing an informed consent form. Fifteen individuals were classified as having morbid-obesity (BMI ≥ 40 kg/m²) and 20 as having moderate-obesity (BMI: 30.0 – 39.9 kg/m²). Gene expressions of CGI-58 and NLRP3 were evaluated using RT-qPCR technique.

**Results:** The two analyzed groups were similar regarding homeostasis model assessment-IR (HOMA-IR), basal metabolic rate, and lipid and glycemic profile (all P >0.05). NLRP3 expression seems to be increased in morbid-obese patients as compared to the moderate-obesity group, although this difference did not reach formal statistical significance (1.44 (0.38 – 4.11) vs. 0.72 (0.31 – 3.60), P=0.058). In contrast, CGI-58 expression seems to be decreased in morbid-obese patients (0.47 (0.19 – 1.33) vs. 0.70 (0.28 – 2.15), P=0.070). Interestingly, we observed a positive correlation between NLRP3 expression and triglyceride levels (r=0.685, P=0.001). No significant correlations were observed between CGI-58 and NLRP3 expressions and HOMA-IR (P >0.05).

**Conclusions:** Our preliminary results suggest that NLRP3 and CGI-58 gene expressions are different between morbid-obese and moderate-obese patients. Moreover, our data indicating that NLRP3 expression is correlated with triglycerides is in agreement with studies showing an effect of diet on NLRP3 regulation.

**A142**
Influence of intensity of exercise training on physical performance and myocardial morphology of female rats with type I diabetes mellitus
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A142

**Background:** Diabetic cardiomyopathy is associated with cardiac muscle remodeling, resulting in myocardial dysfunction, whereas physical exercise is an important strategy for the management of diabetes mellitus (DM).

**Objectives:** This study aimed to investigate the influence of high-intensity and low-intensity training on the structural remodeling of the heart in rats with unmanaged experimental Type 1 DM.

**Materials and methods:** Ninety-day-old female Wistar rats were divided into three groups: exercised-control (EC; n=5), high intensity exercised-diabetic (HIED=high intensity training, 80% of the maximum speed in the stress test; n=4) and low intensity exercised-diabetic (LIED=low Intensity Training, 40% of the maximum speed in the stress test; n=6). The diabetes was induced in the rats by administration of Alloxan monohydrate Sigma (ALX, 50 mg kg-1 BW). Fatigue strength test and the maximal exercise test were performed before DM induction. Fatigue strength test consisted of treadmill running at 20m/min with slope equal to 0° until the animal could not run spontaneously. Time and distance were determined at the end of the race. Maximal exercise test consisted of treadmill running with a load of 5m /min every 3 min until the animal could not run spontaneously, when it was determined the maximum load. Animals ran on a treadmill running 1 hour/day, 5 days/week for 6 weeks with a load (high or low intensity). After this period animals were sacrificed and hearts removed, weighed and prepared for histomorphometric analysis.

**Results:** Six weeks after ALX induction, blood glucose in the HIED and LIED groups were greater (p < 0.05) than EC group. HIED group showed increase (p < 0.05) of maximum speed of the effort test. Regarding the fatigue strength test only HIED group showed greater total test time (p < 0.05). Cardiomyocytes density of diabetic groups had higher values compared to the EC (p <0.05). Diabetic animals showed cardiac hypertrophy and this is most significant in the HIED group (p < 0.05). The myocardium of diabetic rats had increased fibrosis (p < 0.05). More importantly, these tissue fibrosis were attenuated by high intensity training.

**Conclusion:** Physical training favored the physical fitness and attenuated heart pathological changes of the animals, which are more significant in the HIED group. Furthermore, physical training at different intensities appears to have differential effects on bone histomorphometric parameters of diabetic animals.
**A143**

Inhibition of PTP1b in the amygdala reduces food intake, body weight and modulates glycemic homeostasis in obese rats

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A143

**Background:** The control of food intake depends, in part, on the action and signaling of hormones, such as insulin in hypothalamic neurons. In obesity, inflammatory cytokines activate protein phosphatases, such as protein tyrosine phosphatase 1B (PTP1B). PTP1B interacts with the insulin receptor (IR) and the insulin receptor substrate (IRS1), inhibiting them in hypothalamus. Other brain regions, that are part of the dopaminergic reward system, such as the amygdala, participate of the control of energy balance in parallel to the hypothalamus. Insulin exerts its anorexigenic effect also through the amygdala and, in obesity, this effect is abolished. 

**Aim:** To investigate whether PTP1B expression is increased in the amygdala of diet induced obese (DIO) rats and whether the inhibition of PTP1B has any effect on energy metabolism or on insulin signaling, or action in the central nucleus of the amygdala (CeA) in DIO rats.

**Materials and methods:** Male Wistar rats with 8 weeks old were divided into two groups: Chow (n=25) fed with standard rodent chow, and DIO (n=25), that received high fat diet, both for more 8 weeks. To assess PTP1B protein expression, 5 animals from each group were anaesthetized and, then, perfused with 4% paraformaldehyde. The other 20 animals were undergone to stereotactic surgery for implantation of the cannula in CeA. After recovery, the animals were treated with sense and antisense oligonucleotide (ASO) for 7 days, to inhibit the expression of PTP1B in CeA, giving rise to the subgroups: Chow+Sense, Chow+ASO, DIO+Sense e DIO+ASO. During treatment, the parameters evaluated were blood glucose and body weight. At the end of treatment was conducted the euthanasia of animals for extraction of CeA.

**Results:** Animals fed high fat diet had greater body weight gain, insulin resistance and increased PTP1B expression and activation in CeA compared to Chow group. When treated with ASO, DIO animals showed reduced expression of PTP1B in CeA, loss of body weight and food intake, and decrease in blood glucose levels, reaching values similar to those presented by the animals of the Chow group.

**Conclusion:** These data suggest that the inhibition of PTP1B in the amygdala improved glycose homeostasis and reduced food intake and body weight in obese rats.

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**A144**

Reduced soluble TNF-like weak inducer of apoptosis (sTWEAK) and increased frag in postmenopausal women with metabolic syndrome

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A144

**Background:** Recent evidence in the literature has reported the association between the soluble bioactive form of TNF-like weak inducer of apoptosis (sTWEAK) to insulin resistance, type 2 DM, chronic kidney disease, and atherosclerosis. To date, just a single study has evaluated this novel inflammatory cytokine in Metabolic Syndrome (MetS), showing a reduction in the circulating levels of sTWEAK in elderly Caucasian patients (>65% hypertension) at high cardiovascular risk. Nevertheless, is not known whether individuals from a mixed population at the primary care may exhibit or not similar changes.

**Objectives:** The aims of this study were to investigate the association between MetS and biomarkers of chronic inflammation (plasma sTWEAK) and oxidative stress (AOPP, Nox, FRAP) in postmenopausal women recruited at community level.

**Materials and methods:** This cross-sectional analysis enrolled 157 women from a previous community-based study of 1057 postmenopausal women covering all basic health units from the municipality of Santa Maria-RS. Participants answered a questionnaire including the clinical history and comorbidities and were submitted to anthropometric evaluation (height, weight, abdominal circumference), measurement of blood pressure and blood sample collection. Plasma levels of sTWEAK were assessed by ELISA. Biochemical analysis (glucose, LDL, HDL, triglycerides) and oxidative stress markers (AOPP, Nox and FRAP) were determined in serum as previously described. The definition of MetS was based by established criteria of the International Diabetes Federation (IDF). This study was approved by the local Ethics Committee. Assimetric data was logN transformed. The significance level was set at P<0.05.

**Results:** No differences in age were observed between postmenopausal women of non-Mets(n=42) and MetS (n=115)groups. The (mean ± SD of age was, respectively, 66.6 ± 7 y and 68.6 ± 6 y in non-MetS and MetS. The diagnosis of hypertension was present in 17% of non-MetS and 85% of MetS women. Interestingly, FRAP levels were significantly higher in MetS (522.6 ± 296 µmol/L) against non-MetS (411.1 ± 221 µmol/L)(p=0.02). sTWEAK plasma was reduced in MetS ( 282.9 ± 158 pg/ml) versus non-MetS (338.3 + 162 pg/ml) and reach significance after logN transformation (p=0.027).

**Conclusion:** Our Results supports for the first time a disruption of sTWEAK and oxidative stress marker (FRAP) in postmenopausal women with MetS in a mixed population obtained from a community-based study.
Figure 1 (abstract A145) Distribution of the components of the metabolic syndrome in the presence of the Hypertriglyceridemic waist phenotype.
A146

FTO polymorphism (rs9939609) and BED in patients with morbid obesity for evaluation towards bariatric surgery
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Background: Obesity is a major health problem in the twenty-first century. Recent research shows that, among people with severe obesity, there is a sub-population that does not respond to behavioral treatment for weight loss. This group presents a type of eating disorder known as Binge Eating Disorder (BED). Recent studies indicate a link between obesity in adults and the rs9939609 polymorphism of the FTO gene. A frequent association of obesity and BED has also been found. Variations in the gene, including the rs9939609 polymorphism, have been associated with obesity and diabetes.

Objective: To identify whether there is any association between the rs9939609 polymorphism of FTO, and the presence of BED in severely obese patients.

Materials and methods: Patients referred to the Endocrine clinic of Hospital de Clinicas de Porto Alegre, with morbid obesity for evaluation towards bariatric surgery, according to the Brazilian guidelines, between January 2010 and December 2013, were studied. The patients answered a structured questionnaire (Binge Eating Scale) for diagnosis of BED. A blood sample was drawn for analysis of the candidate gene polymorphism, and biochemical parameters (fasting plasma glucose, A1c, lipids).

Results: We studied, sequentially, 160 patients, aged (mean±SD) 44.5±11.5 yrs., 78.8% female. 56.7% without BED, 22.3% with severe compulsion and 21% with moderate compulsion. The frequencies of the rs9939609 polymorphism were 21.9% (TT), 41.9% (AT), and 36.3% (AA). BMI was 47.8±7.3 kg/m², weight was 126.8±24.1 kg, waist circumference was 135.2±15.3 cm, fasting glucose 122.3±38 mg/dL. Waist circumference and fasting plasma glucose were significantly different between the three genotypes (ANOVA, p=0.014, and p=0.030, respectively). Waist circumference (140.3±15.9 cm) was higher in the homozygous AA group. Fasting plasma glucose was lower in the AA group (110.8±22.7 mg/dL). Nevertheless, the frequency of BED was not different between the groups, and none of the other variables was different in any of the 3 groups.

Conclusion: In severely obese human subjects, the rs9939609 polymorphism of FTO is not associated with BED.

A147

Exposure to particulate matter modifies the pancreas extracellular/intracellular HSP70 ratio in high-fat diet treated mice: a marker of the diabetes development risk
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Background: Evidences highlights exposure to fine particulate matter (PM2.5) as a risk factor for development of type 2 diabetes (T2D), especially in high-fat diet (HFD) fed mice. Under stressful conditions, cells respond by synthesizing a suite of intracellular stress response proteins, that plays a fundamental protective role in metabolic disorders, the 70 kDa family of heat shock proteins (iHSP70). However, while iHSP70 presents anti-inflammatory proprieties, their extracellular levels (eHSP72), presents pro-inflammatory roles. We propose to investigate the effects of HFD+PM2.5 association in the HSP70 status, and this relation to the risk of developing T2D.

Figure 1 (abstract A147) Effect on [eHSP72]/[iHSP70] ratio, mean ± SD. *Different from Control and PM2.5 group. P=0.005

Figure 2 (abstract A145) Hypertriglyceridemic waist phenotype compared in the presence of IR assessed by HOMA-IR index and hyperglycemic clamp
Materials and methods: Male mice (n=20) were fed standard chow or HFD for 12 weeks, and then, were randomly exposed to daily nasotropic instillation of low doses of PM2.5 (5 μg/10 μL) or saline solution for additional 12 weeks, performing four groups (n=5): Control, PM2.5, HFD and HFD+PM2.5. At the end of the study, we assessed the eHSP72 plasma concentration by highly sensitive EIA method and the pancreas iHSP70 expression by immunoblot analyses. Assuming the ratio R= [eHSP72]/[iHSP70]=1 for the Control group, the R was analyzed separately for each group. R values between 0.0 and 1.0 indicate a predominantly anti-inflammatory (cytoprotective) status, conversely R values higher than 1.0 denotes pro-inflammatory response. Statistical analysis was developed using ANOVA and post hoc Tukey's test.

Results: There were no alterations on eHSP70 plasma concentration (P=0.2798). Pancreas iHSP70 expression was lower in HFD groups (Control 1.0±0.4; PM2.5 1.2±0.6; HFD 0.2±0.1; HFD+PM2.5 0.1±0.1 arbitrary units of HSP70; P=0.0007), already indicating low cytoprotection in these groups. Furthermore, the [eHSP72]/[iHSP70] ratio was increased 3.8 fold in HFD +PM2.5, as shown in Figure 1, denotes pro-inflammatory condition. 

Conclusion: Our study showed that HFD consumption decreases the pancreatic cells defense, and this condition associated with sub-chronic exposure to PM2.5 promotes imbalance in HSP70 status, described by the [eHSP72]/[iHSP70] ratio, indicating an immunoinflammatory status, which can be determinant to trigger a chronic pro-inflammatory state that leads to insulin resistance. These data provides evidence for an important interplay between environmental and dietary challenges that may potentiate the development of T2D, highlighting HSP70 status as a biomarker of this condition.

A149

Waist-to-height ratio as a predictor of metabolic syndrome in a population with different degrees of glucose tolerance

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A149

Background: Obesity appears as a worldwide epidemic, causing concerns and burden to public health. A very damaging complication of obesity is its relationship with the increase of the cardio-vascular risk. We analyzed the association between obesity and the diagnosis of metabolic syndrome (MS) by following the two criteria in effect: NCEP-ATPIII and IDF.

Objective: The aim of this work is evaluate the frequency of MS in patients with a previous diagnosis of obesity.

Materials and methods: The study was a cross-sectional retrospective with 100 patients diagnosed with obesity.

Results: The sample comprises 100 patients, 89 women and 11 men, with means of age 44.05 (±11.92) yrs. old, of weight 116.404 (±23.42) kg, of BMI 45.93 (±7.93) kg/m2 and of Abdominal Circumference of 129.08 (±15.531) cm. From the 100 patients, 34% (n=34) reported performing pretreatment for DM2, 73% for hypertension and 48% for dyslipidemia. According to the NCEP-ATPIII, 73 patients had MS, from which 79.45% carried Morbid Obesity (MO) and 20.55% did not (n=0.564). According to the IDF, 86 patients had MS, from which 77.27% carried MO and 22.73% did not (n=0.634). The average age of MS patients was 45.66 (±11.89) years old and of non-carriers was 39.70 (±11.06) yrs. old (P=0.026), according to NCEP-ATPIII. According to IDF, the average age of MS patients was 44.94 (±12.12) and of non-carriers was 37.50 (±7.94) yrs. old (P=0.042). The average age of the MO was 42.85 (±11.77) and of the non-morbid was 48.32 (±11.72) yrs. old (P=0.057).

Conclusion: There is an elevated frequency of MS diagnoses in obesity carriers using the IDF criteria selecting more patients. It has also been demonstrated the high frequency of comorbidities among obese patients, being hypertension the most frequent of them. The average age was significantly higher at MS patients diagnosed by both criteria. There was also a tendency of patients carrying MO to be of a younger age. Despite the high frequency of MS in the studied patients, the progression of obesity degree does not lead to an increase of the SF frequency. There is an association between the average age and the presence of MS, being more frequent in older patients, but curiously not occurring with the BMI, which proved to be more biased in younger patients. This emphasizes the age as a possible contributing factor to the development of MS.
Objective: The purpose of this study was to investigate the effect of with the calcium and magnesium supplementation in diets offered to Wistar rats.

Materials and methods: A biological assay was conducted with 24 animals, distributed in four groups of six. The control group (GI) received feed prepared according to the AIN-93G standard (19.74% protein, 7.48% lipid, 52.64% carbohydrate, and 3.5% saline mixture, with 5000 mg of calcium and 500 mg of magnesium per kilogram of feed); the calcium-supplemented group (GII) received this diet containing approximately four times this mineral; the group supplemented with magnesium (GIII) received approximately four times this mineral; and the lipid-supplemented group (GIV) received it with a 14% addition of vegetable oil, but no mineral supplementation. The diets were isocaloric (3.57 kcal/g). The variables measured were weight, feed efficiency coefficient, liver and kidney histology, and the following laboratory parameters: total cholesterol (TC), high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglycerides (TG), and serum calcium and magnesium levels.

Results: After 35 days, the GII animals showed the lowest level of feed efficiency when compared with the other groups, and consequently exhibited lower body weight, with a significant increase in VLDL, TG and serum calcium levels and a decrease in serum magnesium. The morphological analysis of liver and kidney revealed tissue damage in all groups that received supplementation.

Conclusion: The supplementation with calcium proved a possible resource for body weight control, in contrast with that observed in the animals that received magnesium supplementation, whose results were similar to those of controls.

A152

Type 2 diabetes in children, adolescents and young adults: association of birth weight, gestational age and metabolic syndrome

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Background: The frequency of type 2 diabetes mellitus (T2D) in children and adolescents is increasing worldwide mainly due to the global epidemic of obesity in childhood. Environmental and genetic factors are being implicated in the pathogenesis of obesity and those who were born large (LGA) or small (SGA) for gestational age are at increased risk of developing obesity and metabolic syndrome (MS).

Objective: The aim of the study was to evaluate the birth weight, gestational age and the prevalence of MS in T2D in youth.

Material and methods: The study enrolled 65 subjects diagnosed as T2D up to 21 yrs. of age from a cohort that began in 2004 in a reference center. A cross-sectional study was conducted to obtain clinical and laboratory data from chart reviews. Body mass index (BMI) was defined according to World Health Organization (WHO) or National Center for Health Statistics (NCHS), adjusted for age and gender, and MS, to International Diabetes Federation (IDF) criteria.

Results: 57 patients were included, with mean age (yrs.) of 14.5±3.1 at T2D diagnosis, diabetes duration of 5.7±4.1 (median 4.8) and 17.6±4.5 at baseline analysis. Among subjects, 65.2% were female, 59.1% white, 48.3% were born appropriate for gestational age (AGA), 34.5% SGA and 17.2% LGA. At diagnosis, 71.2% had acanthosis nigricans and 4.5% developed ketoacidosis (negative autoantibodies). Familial history of T2D was present in 88.7% (27.4% had familial coronary artery disease). Severe degrees of obesity (class II and III) were found in 58.6% of all sample and MS in 76.6%. Both were more frequent in those who were born LGA as compared to being born AGA (obesity: 80.0 vs 50.0%, p=0.009 and MS: 100 vs 66.7%, p=0.036) and no difference was found between SGA and AGA (obesity: 60.0 vs 50.0%, p=0.493 and MS: 80.0 vs 66.7%, p=0.312). The prevalence of the MS components was: 89.1% obesity (waist circumference), 80.6% abnormalities in lipid profile (high triglycerides or low high-density lipoprotein) and 46.1% hypertension. The BMI classification was: 1.5% normal, 26.2% overweight and 72.3% obesity (IMC: 31.9±6.8kg/m2, 24.6% with severe obesity).

Conclusion: Our findings showed a high frequency of familial history of T2D, reflecting a genetic and environmental basis and also an increased prevalence in females, mostly adolescents. In addition, being born LGA predisposed to MS and severe obesity, emphasizing the importance of monitoring risk factors during gestation.

A153

Assessment of glycohemoglobin, plasma glucose curve and C-reactive protein as complementary predictors to diagnose prediabetes: a transversal study

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Background: The shape of the plasma glucose curve has been considered as a predictor for diabetes in the future, and it could be used to diagnose prediabetes.

Objective: This study aims to assess the relationship between glycohemoglobin, C-reactive protein (CRP), oxidative stress markers levels and the shape of the plasma glucose curve during the oral glucose tolerance test (OGTT).

Material and methods: A transversal study was carried out with 59 non-diabetic subjects with increased diabetes risk who underwent an OGTT to analyze glycaemia, insulin, glycohemoglobin, lipids, C-reactive protein, malondialdehyde and carbonyl protein. Glycaemia was assessed at fasting, 30, 60 and 120 min.

Results: Overall, 26 individuals had prediabetes, 28 did not have prediabetes (22 had 1h-OGTT>fasting glycemia, 6 had 1h-OGTT>fasting glycemia) and 5 had diabetes. The 1h-OGTT>fasting glycemia and diabetes groups were excluded, and then a non-parametric test (Mann-Whitney U test) was used to analyze data. There were no statistical differences between 1h-OGTT>fasting glycemia and prediabetes groups in the analysis of glycohemoglobin (5.15 [4.8-5.4]; 5.20 [5.0-5.4]; p=0.17), C-reactive protein [3.70 [1.8-8.9]; 3.96 [1.45-7.13]; p=0.38], lipids and malondialdehyde, but there were differences in fasting, 30, 60 and 120 min glycemia, insulin level [11 [8-13]; 13 [10-18]; p=0.04], Homeostatic Model Assessment-IR [2.45 [1.93-2.95]; 3.30 [2.51-5.02]; p=0.00] and carbonyl protein [0.48 [0.42-0.58]; 0.57 [0.50-0.76]; p=0.02].

Conclusions: These results identify predictors to increased cardiovascular and diabetes risk in individuals without prediabetes and with 1h-OGTT>fasting glycemia, which are similar to predictors in individuals with prediabetes established by the American Diabetes Association criteria.

A154

Effects of long-term reducing gastroplasty roux-y on body weight and clinical metabolic comorbidities in a bariatric surgery service of a university hospital

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Background: Obesity is a major public health issue in Brazil and in the world, increasing the rate of mortality due to comorbidities like: type-2 diabetes mellitus (DM2), arterial hypertension (AH), dyslipidemias, among others. Conventional obesity treatments show little effect in the long term, leading to an increase in the search for bariatric surgery as an alternative for the control and healing of comorbidities.

Objective: To evaluate type-2 diabetes mellitus, arterial hypertension and dyslipidemia in patients submitted to Roux-en-Y Gastric Bypass Surgery (RYGB) in the late post-operative period.
Materials and Methods: Retrospective analysis of 59 patients from PROCIBA (bariatric surgery program of a University Hospital at Rio de Janeiro). Anthropometric (Height and Corporal Weight) and laboratorial (LDL, HDL, VLDL, Triglycerides (TG) and Glucose) data at pre-operative and post-operative periods accessed over medical records. Data comparison was conducted through ANOVA post-hoc Bonferroni test for anthropometric data and paired T-test for laboratorial data. A value of p<0.05 was considered as significant.

Results: 83% of patients were female, with a mean age of 43±11 yrs.-old and 52% had completed high school education (Figure 1). Post-operative mean time was 7±3 yrs. Weight and body mass index (BMI) reduction were registered post-operatively (133±24 kg vs 91±22 kg and 49±8 kg/m² vs 33±6 kg/m², respectively, p<0.05) (Figure 2). Lower laboratory blood test values were registered post-operatively for glucose (101.00±26.99 vs 89,11±15.19, p=0.014), total cholesterol (179.00±37.95 vs 167.48±28.50, p < 0.016), LDL (104.30±33.12 vs 91.46±24.58, p=0.016), VLDL (25.40±11.12 vs 15.68±7.40, p < 0.01), TG (143.35±86,35 vs 82.45±37.39, p < 0.01), although higher HDL levels was registered (43.53±8.23 vs 57.90±15.60, p <0.01 ) (table 2). Prevalence in the pre-operative period for AH, DM2 and dyslipidemia were 76%, 36% and 27%, respectively. At the end of this study, 40% of patients were still in treatment for SAH (Figure 3). Remission for diabetes and dyslipidemia was registered in 81% and 94% patients, respectively (Figure 3).

Conclusion: RYGB has shown an effective procedure in the long term, leading to weight loss and remission for DM2 and dyslipidemia.

A155
Association of body mass index and physical activity with the risk of developing type 2 diabetes mellitus in the next decade
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A155

Background: The chronic noncommunicable diseases appear as the main causes of death and disability in the world. So, type 2 diabetes is one of the most significant and modifiable degrading situation for health.

Objective: To investigate the association of body mass index and physical activity with the risk of developing type 2 diabetes.

Materials and methods: This study was developed during health activities carried out by primary care to 183 city residents members of the interior of Brazilian Northeast. The risk of developing type 2 diabetes in the next 10 yrs. was obtained through the questionnaire Finnish Diabetes Risk Score. It was considered in overweight the users who had a body mass index equal or higher than 25.0, and physically active users who performed a minimum of 150 min of physical activity per week.

Results: It was found a significant association between body mass index (p <0.00) and physical activity (p <0.01) with the risk of developing type 2 diabetes in the next decade. There was a greater participation of
women in the study (121; 66%). In comparison with male gender, female was more physically inactive (105; 57.4%). It was founded a high risk of developing type 2 diabetes in the sample (122, 66.7%).

Conclusions: The results indicate that there may be interference between distribution of body mass as well as to the practice of physical activity and the risk of developing type 2 diabetes in the next 10 yrs.

A156
Thoracic circumference as a predictor of metabolic syndrome and changes in its components in non-obese adults
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A156

Background: The use of anthropometric indices to screen for metabolic and cardiovascular risk factors has been the focus of many studies in recent yrs. Besides waist, abdominal and pelvic circumferences, the upper body segment circumferences have been the most investigated, particularly cervical circumference. However, few studies have evaluated thoracic circumference (TC) for this purpose.

Objective: This study aims to evaluate the relations among TC with the components of metabolic syndrome (MetS) and the ability of this anthropometric parameter in identify MetS among adults with a body mass index (BMI) between 18.5 and 29.9 kg/m².

Materials and methods: Correlations among TC with the components of MetS have been analyzed with correlations tests (Pearson or Spearman). The ability of the parameter regarding the identification of MetS has been analyzed using ROC curve.

Results: There were evaluated 85 men and 191 women and mean age was 34.9 ±11.2 yrs. (33.7 yrs. men; 35.5 yrs. women). The group BMI average was 25.0±2.9 Kg/m² (25.0±2,84 men; 24.9±2,86 women); waist circumference average was 86,9±8,2 cm (89,6±7,9cm men; 85,6±8,1cm women); TC average was 90.0±6,7 cm ( 85,8±6,1 cm men; 87,5±5,2cm women). The prevalence of metabolic syndrome in this group was 28%. TC was found to correlate with all components of MetS except glycaemia, being these correlations stronger with waist circumference. When using ROC curve TC was able to identifying MetS, with best Results in women. TC values of 95.8 cm and 87.3 cm respectively for men and women have presented the greater sensitivity for the prediction of MetS, with specificity ≥ 50%.

Conclusion: These findings suggest that thoracic circumference represents a promising option for metabolic and cardiovascular risk evaluation because this measurement is simple to obtain during clinical evaluation and may identify individuals at higher risk of developing MetS.

A157
Metabolites of nitric oxide as a marker cardiometabolic in blacks
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A157

Background: The use of anthropometric indices to screen for metabolic and cardiovascular risk factors has been the focus of many studies in recent yrs. Besides waist, abdominal and pelvic circumferences, the upper body segment circumferences have been the most investigated, particularly cervical circumference. However, few studies have evaluated thoracic circumference (TC) for this purpose.

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Results: There were evaluated 85 men and 191 women and mean age was 34.9 ±11.2 yrs. (33.7 yrs. men; 35.5 yrs. women). The group BMI average was 25.0±2.9 Kg/m² (25.0±2,84 men; 24.9±2,86 women); waist circumference average was 86,9±8,2 cm (89,6±7,9cm men; 85,6±8,1cm women); TC average was 90.0±6,7 cm ( 85,8±6,1 cm men; 87,5±5,2cm women). The prevalence of metabolic syndrome in this group was 28%. TC was found to correlate with all components of MetS except glycaemia, being these correlations stronger with waist circumference. When using ROC curve TC was able to identifying MetS, with best Results in women. TC values of 95.8 cm and 87.3 cm respectively for men and women have presented the greater sensitivity for the prediction of MetS, with specificity ≥ 50%.

Conclusion: These findings suggest that thoracic circumference represents a promising option for metabolic and cardiovascular risk evaluation because this measurement is simple to obtain during clinical evaluation and may identify individuals at higher risk of developing MetS.
Background: The black population has a high cardiometabolic risk, however low incidence of metabolic syndrome (MetS). In this context, there seems to be a paradox related to the diagnostic criteria of MetS, which makes the presence of the same is underestimated in blacks. This condition brings the need to look for a more reliable marker of actual pathological conditions and cardiometabolic risk of these individuals. A possible marker is nitric oxide (NO). The dosage metabolites nitrite/nitrate (NOx) have been shown to be associated with some criteria of the metabolic syndrome, such as obesity and diabetes, however the literature lacks more specific studies to assess whether altered levels of nitric oxide are associated with metabolic and cardiovascular disease among blacks.

Aim: Analyze the NOx levels as a marker of cardiometabolic alterations in Brazilian blacks, and their applicability as a biomarker of cardiometabolic risk.

Materials and methods: Several anthropometric, biochemical, inflammatory, oxidative and hematological parameters and their relationship with nitric oxide metabolites were measured. NOx levels were distributed in percentiles, the 50% percentile=122.3µmol/L was chosen as the cutoff point. NOx values <122.3 µmol/L were associated with higher body mass index (p=0.01), waist circumference (p=0.03) and hip circumference (p=0.04). As to biochemical criteria, the NOx was significantly correlated to blood glucose levels (p=0.04), triglycerides (p=0.04), albumin (p=0.03), uric acid (p=0.01) and urea (p=0.05). In inflammatory and oxidative stress assessment, only protein carbonylation (p<0.01) was associated with the NOx, in which the damage was greater in subjects who had NOx values lower than the 50% percentile. There was no association between NOx and the blood profile.

Conclusion: To be mainly related to obesity, dyslipidemia and glucose, the NOx was considered a good predictor of cardiometabolic risk in black population, besides being easily adapted to laboratory testing and routine and can be programmed for automatic or semi-automated analyzers, thus requiring very little sample preparation.

A158
Effect of saccharin supplementation on weight gain, caloric intake and basal oxygen consumption in Wistar rats
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Background: The use of non-caloric sweeteners can interfere in the regulation of appetite, promoting greater food intake and weight gain. In previous data, our results showed that animals who consumed yogurt with saccharin and aspartame had a increase in weight compared to the group using sucrose. However, as the total calorie intake was similar between the groups, we speculated that weight gain might be associated with decreased energy expenditure induced by artificial sweetener.

Aim: Determine the caloric expenditure at rest in rats receiving saccharin or sucrose for 12 weeks.

Materials and methods: We conducted a controlled experiment with adult male Wistar rats randomly divided into 3 groups: non-caloric sweetener (saccharin-SAC); caloric sweetener (sucrose-SUC) or control (non sweetened yogurt -CON) given daily over a period of 12 weeks with free chow and water. Weight gain, food intake and water control were determined weekly, basal oxygen consumption was measured at 0, 5 and 12 weeks. We used one-way ANOVA with Dunnett’s test and ANOVA by repeated measures and mixed model assessment.

Results: The SAC group promoted greater weight gain than control (p=0.031). All groups had similar total caloric intake. The maximal oxygen consumption was not different between groups during the whole experiment, respectively: SAC (basal 27.72±1.91; 5 weeks 28.39±1.96 and 12 weeks 27.16±3.87), SUC (basal 28.66±1.96; 5 weeks 29.35±3.16 and 12 weeks 29.08±1.61) and CONT (basal 27.16±3.87; 6 weeks 28.15±2.53 and 12 weeks 27.56±3.97).

Conclusion: The cumulative weight gain in the animals fed with saccharin can not be attributed to a reduction in energy expenditure. Further studies are necessary to determine metabolic causes for weight gain induced by saccharin in rats.
Evaluation of pancreatic parenchyma proliferation into synthetic matrix implant in diabetic and non diabetic mice
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A159

Background: Biomaterials has been the focus of diversity studies in medicine regenerative area. It’s important that they can providing a microenvironment of interaction of cells and extracellular matrix. Synthetic matrix of polyether polyurethane has been used by our research group as a biomaterial applied in the study of angiogenesis, inflammation and tissue repair.

Objectives: Assess the growth of pancreatic parenchyma into synthetic matrix implant in diabetic and no diabetic mice and the associated angiogenic/inflammatory parameters.

Materials and methods: The diabetes induction it was performed by streptozotocin administration. The synthetic matrix was implanted next the pancreas of animals (diabetics and control) and 20 days after, they were collected and processed for histological, immunohistochemical and biochemical analysis.

Results: The proliferation of pancreatic parenchyma was observed into implants in both groups. In control group there was more cells of pancreatic islet immunostaining to insulin into implant. The diabetic group showed lower number of blood vessels but not VEGF levels. The inflammatory parameters assessed (TNF-α and CCL-2) it was higher in diabetic group than control. The number of foreign body giant cells decreased after diabetes.

Conclusions: Despite the diabetic state seems alters some characteristics of tissue that growth into implant, the synthetic matrix used support a favorable microenvironment to proliferation of pancreatic parenchyma in vivo.
A160
Experimental model of type 2 diabetes induced by fat diet consumption and low dose of streptozotocin in C57BL/6J mice
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Background: Studies with murine model have been extensively used as a tool in the understanding of mechanisms involved in diseases such as diabetes (Correia-Santos et al, 2012; Chorilli, 2007). Diabetes is characterized as a heterogeneous group of metabolic disorders having in common hyperglycemia, which may result from defects in insulin action or secretion or even in both. The same can be divided into four groups: type 1 diabetes mellitus (DM1), type 2 diabetes mellitus (DM2), gestational diabetes mellitus, and other specific types of diabetes (SBD, 2014). It is known that DM2 is associated with overweight and obesity, physical inactivity, metabolic syndrome, diet high in saturated and animal fat, among others. (Paulweber et al., 2010).

Objective: To evaluate the effectiveness of induction of type 2 diabetes mellitus Protocol based on a high fat diet associated with low doses of streptozotocin in C57BL/6J mice that simulates the characteristics observed in humans and makes possible subsequent therapeutic propositions and to analyze the consumption of this diet.

Methodology: 83 C57BL/6J mice, with 28 days in the post-weaning period were used. The control animals were divided into experimental groups that received the standard diet for laboratory animals and fat diet composed of a mixture of standard diet, 10% of butter, 1% cholesterol and 0.1% cholic acid for 5 weeks, receiving a low dose of streptozotocin (35mg/kg) at weeks 4 is 5. Both groups (healthy and induced) received the equivalent of 144,3g feed per cage from this point. The animals received food and water ad libitum and such consumption was measured, as well as their weights. Their blood glucose levels were measured on days 0, 35 and 42.

Results: At the end of five weeks, only 11.68% of induced mice showed corresponding glucose to diabetes. Animals’ induction group had a weekly average of 100,41g of feed per cage, making 20,35g of feed/mouse. On the other hand, the control group had an average of feed for cage of 115g, and 19,3g of feed consumption/mouse over this period. As for weight, the healthy group increased on average by 8.11% and induced by 9.03%.

Conclusion: The animals fed the high fat diet had higher food intake when compared to the control group animals. However, this model for induction of diabetes has proven inefficient.
A161
Metabolic syndrome, diabetes and inadequate lifestyle in first-degree relatives of acute myocardial infarction survivors younger than 45 yrs. old
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A161

Background: Acute Myocardial Infarction (AMI) before the age of 45 is unusual and is associated with a familial component. This study evaluated cardiovascular risk factors in a cross-sectional study of first-degree relatives of Brazilian patients with premature MI.

Materials and methods: A total of 166 first-degree relatives (FDR) of 103 patients with MI age <45 yrs. were matched for sex and age with a group of 111 individuals with no family history of cardiovascular disease (control group). Familial hypercholesterolemia was excluded. Patients were evaluated for the presence of metabolic syndrome, its components, and lifestyle (smoking, alcohol consumption, and sedentarism). Laboratory analysis included fasting blood glucose, plasma lipids, and thyrotropin (TSH).

Results: The prevalences of smoking (29.5 vs. 6.3%, p<0.001), prediabetes (40.4 vs. 27%, p<0.001), diabetes (19.9 vs. 1.8%, p<0.001), metabolic syndrome (64.7 vs. 36%, p<0.001), and dyslipidaemia (84.2 x 31.2%, p: 0.001) were higher in FDR individuals. Triglycerides (179±71 vs. 140±74mg/dL, p: 0.002), LDL-cholesterol (122±36 vs.113±35mg/dL, p: 0.031), non-HDL cholesterol (157±53 vs.141±41mg/dL, p: 0.004), and TSH levels (2.4±1.6 vs. 1.9±1.0, p: 0.002) were also higher, and HDL-cholesterol (39±10 vs. 48±14mg/dL, p<0.001) lower in FDR. No significant differences were observed between groups for body mass index, abdominal obesity, hypertension, total cholesterol, and fasting blood glucose levels.

Conclusions: FDR of patients with AMI < age of 45 yr. old without familial hypercholesterolemia present elevated prevalence of the metabolic syndrome and its components, as well as an inadequate lifestyle.

A162
Cardiovascular risk factors in patients with premature myocardial infarction and in their first-degree relatives
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A162

Background: Acute myocardial infarction (AMI) is unusual in people before age 45 and is related to premature family history of cardiovascular disease.

Objective: Describe socio-demographic and cardiovascular risk factors of subjects with AMI<45 yrs. old and their first-degree relatives. Evaluate association of clinical and laboratory parameters with angiographic extension of coronary artery disease (CAD).

Materials and methods: Cross-sectional study conducted in a tertiary hospital (November/2010 – January/2015). We included 103 index cases and 166 first-degree relatives without suspicion of familial hypercholesterolemia, compared with 111 asymptomatic individuals without family history of CAD matched for sex and age. Clinical and laboratory parameters were evaluated. Associations were tested by statistical analysis.

Results: AMI cases had higher prevalence of smoking (57.3% vs. 28.6%, p<0.001), type 2 diabetes mellitus -DM2 (43.4 vs. 19.5%, p<0.001), and hypertension (42.7 vs. 19%, p<0.001), when compared to relatives. When compared to controls, cases showed higher triglycerides (192±75mg/dL vs. 146±74mg/dL, p<0.001), and metabolic syndrome –MS (82.2% vs. 36%, p<0.001), and lower HDL-c (36±12mg/dL vs. 48±14mg/dL, p<0.001). Multivessel disease was found in 50.5% of cases. It was independently associated with hypertension (p=0.030), and DM2 (p=0.028) after multivariate analysis. In comparison to controls, relatives had greater prevalence of smoking (29.5% vs. 6.3%, p<0.001), DM2 (19.9% vs. 1.8%, p <0.001), pre-diabetes (40.4% vs. 27%, p<0.024) and MS (64.7% vs. 36%, p<0.001), lower HDL-c (39±10mg/dL vs. 48±14mg/dL, p<0.001), higher triglycerides (179±71mg/dL vs. 140±74mg/dL, p=0.002), higher LDL-c (122±37mg/dL vs. 113±36mg/dL, p=0.031), non-HDL cholesterol (157±43 vs. 141±41mg/dL, p=0.004), and higher prevalence of high/intermediate calculated coronary heart disease risk according to Framingham risk score (82.7% vs. 2.6%, p<0.001). There was no difference in BMI (p=0.051). TSH levels even within the reference value method were higher in AMI patients (2.6±1.6mUI/mL, p<0.001) and relatives (2.4±1.6mUI/mL, p<0.002) in comparison with controls 1.9±1.0mUI/mL. Conclusion: High prevalence of risk factors mainly MS, atherogenic dyslipidemia, DM2, hypertension and smoking were encountered in cases and first-degree relatives of individuals with AMI <45 yrs. Hypertension and DM2 were associated with greater angiographic extent of coronary artery disease.

EDUCATION, NURSING AND PSYCHOLOGY IN DIABETES

A163
Effectiveness of a serious game for medical education on insulin therapy for diabetes: randomized controlled trial
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Background: Most patients with diabetes mellitus (DM) are followed by primary care physicians, who often lack knowledge about DM care, especially on insulin. Traditional continuing medical education has little effectiveness, so new educational approaches are required.

Objectives: To assess the applicability, acceptance, and effectiveness of a serious game for medical education on insulin therapy for DM.

Methods: A serious game called InsuOnLine® was developed by experts in endocrinology, medical education, and games. Game design was based on modern adult learning theories, and recommendations were adapted from main DM guidelines. A randomized unblinded controlled trial (RCT) was performed to assess the effectiveness of the game, played in “real-world” conditions (in players’ own computers and in their free time), compared to a traditional on-site learning activity, both with same content and duration (3-4 h). Primary care physicians from South of Brazil who were not specialists in endocrinology or diabetes were invited to participate, and randomly allocated to one of the groups. Knowledge, problem-solving skills, attitudes, and satisfaction were assessed by a questionnaire applied at baseline, immediately after interventions, and three months later.

Results: Eighty-eight physicians were allocated to game group; from those, 69 (78%) finished the game, which demonstrates good applicability. Those 69 were included in final analysis. Other 65 physicians were included in control group. Both groups were similar at baseline: 49% were female, and mean age was 38. Both interventions were very well rated, regarding methodology and satisfaction. The gain of knowledge and skills was significant in both groups, with the percentage of right answers going from 52% at baseline to 85% after traditional activity (p<0.001), and to 92% after the game (p<0.001). Three months later, that percentage decreased to 76% in control and to 80% in game group, both it remained significantly higher than at baseline. Absolute increase in performance was higher in the game group (40%) than in control (34%, p=0.01). Attitudes were more significantly improved in the game group than in control. Three months after interventions, all subjects in control and 99% in game group said that the intervention had had real impact on their practice.

Conclusion: The serious game InsuOnLine® is applicable, well accepted, and very effective for medical education on insulin.
Study of influence of a model guidance about the laboratory tests and disease in knowledge and self-management of patients with type 2 DM

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Background: Diabetes mellitus (DM) has been considered a growing worldwide epidemic, with global distribution, more prevalent in developing countries. This disease causes a reduction in the quality of life of people who have it, and has brought about the increase of problems for public health systems, with extremely high social costs, especially when diagnosed late. In turn, the possibility of increasing the knowledge of the disease, in conjunction with individual behavior changes by persons with T2D, is a strategy to be considered in order for these individuals to be able to control glycemic levels more easily.

Objective: Bearing this in mind, this study has the objective of evaluating the efficacy of the methodology of an educational program based on improving self-knowledge of diabetes, while also analyzing lab results, and treating the disease.

<table>
<thead>
<tr>
<th>Tests done (mg/dL)</th>
<th>Pre-intervention time</th>
<th>Post-intervention time</th>
<th>n</th>
<th>%</th>
<th>Average</th>
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<th>Average</th>
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<tr>
<td>≤ 110</td>
<td>12</td>
<td>15,8</td>
<td>25</td>
<td>84,2</td>
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<td>&gt; 110</td>
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<td>67,1</td>
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<td><strong>Total Cholesterol</strong></td>
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<td>≤ 200</td>
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<td>63,2</td>
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<td>77,6</td>
<td>175,5 mg/dL</td>
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<td>&gt; 200</td>
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<td>36,8</td>
<td>17</td>
<td>22,4</td>
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<td><strong>Triglyceride</strong></td>
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<td>63,2</td>
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<td>36,8</td>
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<td><strong>Hb A1C</strong></td>
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<td>≤ 7 %</td>
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<td>32,9</td>
<td>33</td>
<td>43,4</td>
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<tr>
<td>&gt; 7 %</td>
<td>51</td>
<td>67,1</td>
<td>43</td>
<td>56,6</td>
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</table>

Source: Research Data  p < 0.05

Figure 1(abstract A164) Percentage of patients and average values of laboratory tests performed (n=76) and perception of patients in relation to their knowledge about the results of laboratory tests.
Materials and methods: This study was done with 76 patients with diabetes (68.4% women and 31.6% men) registered in 12 health clinics of the central-south sanitary district of the municipal health department of Belo Horizonte. The analysis of the patients’ level of knowledge before and after the implementation of the program was based on questionnaires given to patients before and after intervention.

Results: Of exams done before and after the intervention, the following averages were obtained: Glycemia before the intervention: 161.4 mg/dL and after the interventions: 136.4 mg/dL, Total Cholesterol before the intervention: 189.4 mg/dL and after: 175.5, Triglyceride before: 160.6 mg/ dL and after: 135.6 mg/dL, HbA1C before the intervention: 8.6% and HbA1C after the intervention: 7.8%.

Conclusion: Notably, the improvement in the lab Results thus suggests the efficacy, in the context of this research, of the methodology utilized to better patients’ self-knowledge of diabetes.

A165
Evaluation of the understanding of the degree of diabetes decompensation in elderly patients without satisfactory glycemic control
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Background: The prevalence of diabetes is increasing among the elderly. In addition to the care needed to maintain appropriate blood sugar levels, it is necessary to understand the disease. Often, this population may be more difficult to understand the risks and other factors related to the disease.

Objectives: Assess the degree of understanding of diabetes without appropriate control in elderly patients. Materials and methods: We performed a Cross study of diabetic patients in the Endocrinology Department of a Brazilian tertiary hospital who were treated between June and December 2014. We include patients over 60 yrs. of age, of both sexes, with HbA1C ≥ 8.5% using oral hypoglycemic agents and insulin. All patients underwent five questions related to satisfaction with the diet and treatment for diabetes. We reviewed the records of patients to assess the previous glycemic control.

Results: Forty-five patients were included. Glycated hemoglobin was 10.08 ±0.31 (12 months before), 10.46±0.32 (six months before) and 10.34±0.22 during the interview. When asked about the lack of clear and concrete goals diabetes care, 40% of patients responded not have problems. Another 40% considered a serious problem. The other responded intermediate response. On “feel discouraged with the treatment,” only 28% considered a serious problem and 46.7% do not consider a problem. When asked about “diet deprivation,” 20% considered a serious problem, and 48.9% did not have concerns about it. We also ask if the patients were satisfied with their current treatment. 64.4% declared satisfied, and only 4.4% reported being dissatisfied. Other answering “more or less”. The last question was about self-understanding of diabetes. 71.1% say understanding about their illness. Only 6.7% reported not being satisfied.

Conclusion: Despite the inappropriate glycemic control, most patients do not understand the severity and stage of disease.

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A166
Diabetes education improves eating habits and quality of life in type 1 diabetes in carbohydrate counting
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Background: Counting carbohydrates, nutritional therapy of choice to type 1 diabetics (DM1), allows flexibility in food choices, avoiding diets based on restrictions, and patients can use any food within a healthy eating plan. With an emphasis on the amount of carbohydrates, a change in the quality of the menu, which can lead to inclusion of foods with high glycemic index and high in fat, is often observed, frequently causing weight gain and worsening of lipid profile. Educating and motivating type 1 diabetics in carbohydrate counting to follow continuously the healthy eating plan is a big challenge. In diabetes education group, reinforcing the theory of good nutrition along with carbohydrate counting, with the aim of facilitating the daily planning meals or food exchanges in social gatherings, can be a strategy to improve adherence to nutritional treatment.

Objective: The purpose of this study was to evaluate the effectiveness of diabetes education in adherence to healthy eating plan and quality of life in patients with type 1 diabetes in carbohydrate counting.

Material and methods: Sixteen patients with DM1 in carbohydrate counting underwent a nutrition education program on diabetes during four weeks and then reassessed at 1 and 3 months. Anthropometric and biochemical (A1C e lipid profile) test Results, total daily dose of insulin, and adherence to plan healthy food were analyzed; questionnaires about healthy eating, calculation of 3-day food record, and quality-of-life (Problems Areas in Diabetes-Brazil [B-PAlD]) were also assessed.

Results: Before and 1 and 3 months of the project, an increased adherence to healthy eating plan was demonstrated, with a significant decrease in caloric intake (p=0.008), carbohydrates (p=0.001), and lipids (p=0.04); an improvement in lifestyle habits like eating fruits, foods with sugar or sweets and lower supply frequency in fast foods; and improved overall reading nutrition label and proper treatment of hypoglycemia (p 0.05). Improvement on the scale of quality-of-life B-PAlD was observed during the 3 periods (p=0.001). There was no difference in anthropometric and biochemical tests between periods.

Conclusion: This study demonstrated that a program of nutritional education in diabetes group for T1D in carbohydrate counting was effective in increasing adherence to healthy eating plan and improving the quality-of-life indices.

A167
A point of view of poor control of diabetes: presence of disease and diagnosis time
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Background: Developing countries has experienced changes in their profile, as the aging and alterations in lifestyle of population. It has been associated with the high increase in chronic diseases like Diabetes Mellitus Type 2 (DM2), which is connected with increasing prevalence of obesity and aging process. In Brazil, some studies have shown the difficulties of the health care to control diabetes as well as their complications. As a result, low quality of life (QL) is verified in the population with DM2, which may be the starting point to change the possible gaps on the treatment of the disease.

Objective: The aim of this study was to evaluate the QL of adults and elderly with and without DM2. Two perspectives were considered to check QL: the presence and the time of diagnosis.

Materials and methods: The survey population consists of individuals (men and women) with and without DM2, living in Viçosa-Minas Gerais, aged ≥ 40 yrs. and with low schooling. The sample was divided in three groups: control (CTRL), individuals without DM2 or any disease in target organs; G1, individuals diagnosed DM2 ≥1 year and ≤5 yrs. and G2, individuals diagnosed DM2 ≥ 10 yrs. We checked sociodemographic and therapeutic data, cognitive state by Mini Mental State Exame, vasomotor and cardiovascular (WC) and glycosylated hemoglobin (HbA1C). For the assessment QL SF-36v2® was applied.

Results: 198 individuals (CTRL=81; G1=47; G2=61), with mean age 60.3 ±10.7 yrs. and schooling 4.7±2.9 yrs. were evaluated. 55.5% were elderly, 62.6% women and 57.3% using insulin. The cognitive state was similar between groups (CTRL: 24.5±2.3; G1: 23.4±3.9; G2: 23.3±3.7). The WC

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showed significant difference between CTL and DM2 (p<0.001) with higher means to DM2 (104±15.7) compared to CTL (94.9±11.2). The HbA1C mean in both groups of DM2 was similar (G1: 9.1±1.9%; G2: 8.7 ±2.2%). Relating to QL, we found significant differences between CTL and DM2 just for physical component (p<0.001) without difference in mental component (p>0.05). Analyzing the time of diagnosis, no difference for QL were verified between G1 and G2 (p>0.05).

**Conclusion:** People with DM2, in poor control of disease, presents significant lower QL when compared to CTL group. The physical component showed the strongest role in lower scores for QL. In the other hand, we not verify differences in QL as well as glycosylated...
**Table 2:** Dietary intake assessed by dietary record time of 72 hours for review.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Time 0</th>
<th>Time 1</th>
<th>Time 3</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caloric intake (kcal)</td>
<td>1787 (318)</td>
<td>1584 (469)*</td>
<td>1598 (434)*</td>
<td>0.008</td>
</tr>
<tr>
<td>Carbohydrate (kcal) ( % VCT)</td>
<td>947 (212)</td>
<td>838 (258)*</td>
<td>818 (246)*</td>
<td>0.001</td>
</tr>
<tr>
<td>Protein (kcal) ( % VCT)</td>
<td>311 (74)</td>
<td>299 (73)</td>
<td>335 (76)</td>
<td>0.3</td>
</tr>
<tr>
<td>Fat (kcal) ( % VCT)</td>
<td>531 (110)</td>
<td>446 (189)</td>
<td>445 (157)*</td>
<td>0.04</td>
</tr>
<tr>
<td>TEE (kcal)</td>
<td>2.248 (225)</td>
<td>NA</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>Prescribed diet (kcal)</td>
<td>1.673 (230)</td>
<td>NA</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>Calorie supply (%)</td>
<td>107</td>
<td>95</td>
<td>96</td>
<td>-</td>
</tr>
</tbody>
</table>

* p < 0.05 between times 0 and 1; † p < 0.05 between times 0 and 3; VCT: total caloric value; TEE: total energy expenditure; NA: not applicable. Values expressed as mean (standard deviation).

**Figure 2**(abstract A166) | Dietary intake assessed by dietary record time of 72 hours for review

**Figure 3**(abstract A166) | Score on the questionnaire B-PAID and its subdimensions for the evaluation of time
hemoglobin between G1 and G2, suggesting that the diagnosis time could have been neutralized by poor control of DM2.

A168 Problem areas in diabetes and glicemic control in type 1 diabetes in a public diabetes center
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A168

Background: People with type 1 diabetes (T1D) encounter a series of chronic stressors related to their condition. Common issues include worry about complications, fear of hypoglycemia, and inescapable preoccupation with food, exercise, and dietary regimens. Other sources of distress include misplaced illness beliefs, lack of knowledge, social support or explanations as well as feelings of being overwhelmed by the illness and its requirements.

Objective: Assess emotional problems related to diabetes in relation to glicemic control in patients followed in an Educational Program of a public service.

Materials and methods: Seventy-seven patients diagnosed with T1D followed for a minimum period of one year in interdisciplinary treatment and education program were divided into two groups according to A1C (<8%, n=40 and ≥ 8%, n=37). Structured interview and the instrument B-PaID (Brazilian version of the PAID scale-Problems Areas in Diabetes) were performed individually with each participant.

Results: In both groups were found B-PaID total score <40 points, which means low level of emotional stress. In the comparison between the groups was demonstrated score significantly greater in group with A1C ≥ 8% (p <0.05) within the sub-dimensions related to emotional (p=0.01) treatment (p=0.42) and social support (p=0.009). Age correlated negatively with social support (p=0.039). The A1C was positively correlated with the total score on the PaID (p=0.026) and the sub-dimensions related to emotional (p=0.044), treatment (p=0.016) and social support (0.001).

Conclusions: In people with T1D, DM-specific distress measured by the PaID correlated significantly with impaired glicemic control, even in patients regularly treated in a diabetes center with formal diabetes education. Specific educational programs aimed to these groups could help in achieving glicemic targets.

A169 Nursing education action in the quality of life of patients with diabetes mellitus type I
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A169

Background: The measurement of quality of life (QOL) in patients with diabetes and its complications has been the subject of several studies in order to determine the necessary changes to improve their welfare. Thus, health education plays a significant role in the diabetic patient’s therapy.

Objectives: Apply an educative action in relation to medication and non-medication treatment for patients with diabetes type 1.

Materials and methods: An exploratory, descriptive and quasi-experimental study in outpatients with Diabetes Type I whose data collection was conducted in two phases. In the first phase the educational action was held during seven meetings and in the second phase, three months after, questionnaires on patient satisfaction and evaluation of quality of life were applied. The educational action focused on the beliefs of self-efficacy for medication and non-medication treatment aiming at changing behavior for self-care and consequent improvement of QOL. It was used Diabetes Quality of Life Measure (DQOL) and patient satisfaction instrument.

Results: The sample included 23 patients with DM type I, the majority were women (70%), and the average age was 34 yrs. old (≤10.17). After the educational intervention, there was a decrease in QOL scores, in which men showed to be less concerned about than diabetes women; patients who held a job were more satisfied with their quality of life and the disease had less impact on their life; and those who were not used to drinking alcohol were more concerned with the disease. Regarding the educational action, patients reported that it had contributed to food consumption, improved the quality of life and the glicemic control, and clarified the use of insulin and foot care.

Conclusion: The proposed educational action was considered by most patients as excellent and satisfactory, and to have contributed to the disease control. Therefore, it is vital for the health team intervention proposals that are effective for self-care and as a consequence an improvement in the disease management and in the quality of life.

A170 Comparison between adherence assessments and blood glucose monitoring measures to predict A1c in type 1 diabetes
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A170

Background: Treatment adherence is crucial in patients with diabetes; however, there is disagreement on how to measure adherence in adults with type 1 diabetes (T1D). Surveys have been validated to evaluate adherence, and several studies have demonstrated a strong correlation between frequency of blood glucose monitoring (BGM) and glicemic control.

Objective: We conducted multivariable regression analyses to compare adherence assessments and BGM measures with regard to their ability to predict A1c in adults with T1D.

Materials and methods: Four instruments evaluated adherence: Self-Care Inventory-Revised version (SCI-R), a self-administered survey; Diabetes Self Monitoring Profile (DSMP), a survey administered by trained researchers; a categorical (yes/no/sometimes) self-report question (“In the past month, did you take care of your diabetes as your doctor recommended?”); and a continuous adherence self-evaluation, which ranged from 0-100. BGM frequency was evaluated by self-report, BGM diary, and meter download. Glicemic control was assessed by A1c (HbA1c).

Results: Participants (N=82; 63% males) were aged 39.0±13.1 yrs. with a mean diabetes duration of 21.2±11.1 yrs.; 27% had BGM frequency >4 times/day and 39% were overweight/obese. Mean A1c was 8.9±2.2% and only 11% met the target HbA1c of <7%. The adherence assessments appeared to be interrelated (P<0.01), as well as the BGM measures (P<0.001). Among the adherence assessments, DSMP score was the strongest predictor of glicemic control (r=-0.32, P=0.004), while BGM assessed by meter download was the strongest predictor of A1c among the BGM measures (r=-0.40, P<0.01). Moreover, the correlation between DSMP score and BGM by meter download was the strongest identified correlation in the adherence and BGM measures (r=-0.52, P<0.001). All the self-report assessments had a significant but weak correlation with glicemic control (r=-0.27, -0.28; P=0.02). The final adjusted model identified the assessment of BGM frequency by meter download as the most robust predictor of A1c (estimate effect size=-0.58, P=0.003).

Conclusions: This study provided an opportunity to evaluate and compare adherence assessments to predict Hba1c. Although surveys like DSMP are an easy-to-use instrument to assess adherence, BGM assessment by meter download seems to have the strongest relationship with glicemic control in adults with T1D.

A171 Assessment of satisfaction, impact and emotional stress in elderly diabetics without satisfactory control of disease
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A171
Background: Psychological stress is common in relation to the care needed for patients with chronic diseases. In addition, diabetes (DM) can present major impact on patients’ lives and the degree of satisfaction with the established treatments. Patients without adequate glycemic control may be exposed to greater stress.

Objectives: To assess the impact and the degree of satisfaction in the quality of life of patients with psychological stress related to DM in elderly patients without adequate glycemic control.

Materials and methods: We performed a historical case-control study of diabetic patients in the Endocrinology Department of a Brazilian tertiary hospital who were treated between June and December 2014. We include patients over 60 yrs. of age, of both sexes, with HbA1c ≥ 8.5% using oral hypoglycemic agents and insulin. Patients were submitted to BPAID (Problems Ares in Diabetes – Brazil) and DQOL (Diabetes Quality of Life) questionnaires, both validated in Portuguese. The first evaluates emotional stress related to DM in 20 questions. On the second, we use the variables “impact” and “satisfaction” to evaluate quality of life. There were 33 issues. We divided the patients into two groups, according the mean of score BPAID (39.43). There are no pre-defined cutoff point for this BPAID questionnaire. The higher the final score, the greater the stress related to DM.

Results: Forty-five patients were included. There were no differences between the groups for age, gender, education, race, religion, smoking and alcohol. There was no difference in HbA1c (10.75% vs. 9.98%, p=0.09) in the moment of interview. However, the HbA1c levels was greater in the year preceding study in patients with the worst stress scores (10.87% vs. 9.31%, p=0.023). Number of medicines used, dose of Insulin UI/kg, number of daily insulin injections or use of Regular insulin, weight, presence of hypoglycemia, blood pressure levels, or presence of chronic complications associated were not different. Patients with higher levels of stress presented greater negative impact of diabetes on quality of life compared to patients with lower levels of stress (p<0.001). Results were similar with respect to the degree of satisfaction (p<0.001).

Conclusion: Emotional stress associated with DM can be related with worse quality of life in elderly diabetics and chronic glycemic uncontrol. Differences between social characteristics or relating to the treatment of DM did not differ between groups.

A172
Creating a nutritional traffic light able to help in education for diabetes self-management
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A172

Background: Diabetes mellitus is a chronic disease that requires ongoing medical care, and education on self-management, in order to avoid acute complications and reduce the risk of chronic complications. Feeding recommendation for people with diabetes is no different from healthy people, being based on adequate intake of carbohydrates, proteins and fats adjusted to metabolic targets, energy needs and individual preferences. Educating and motivating people with diabetes to follow continuously eating plan is a major chronic challenge. Applying diabetes education through educational materials reinforcing the theory of good nutrition in order to facilitate the daily meal plan and food choices can be a strategy to improve adherence to nutritional therapy.

Figure 1(abstract A172) The educational pamphlet
Objective: To develop an educational material with nutritional information on food labeling that is able to assist the population with diabetes to make healthful choices.

Materials and methods: The educational material was divided into four parts: 1- labeling food; 2- nutritional information; 3- complementary nutritional facts; 4- nutritional traffic light. The traffic light colour approach to nutritional signpost labelling requires criteria that define the green color if key nutrient is less than or equal 5% of recommendation, amber if between 5% and 25% and red if key nutrient is more than 25. The material was applied to individuals with type 2 diabetes and rated by a specific questionnaire in order to verify its effectiveness.

Results: The chosen format was an informative pamphlet. The final document is located in Figure 1. The nutritional traffic light was able to make the nutritional labeling simpler and easier for the consumer’s understanding. The use of traffic light colour approach in food labeling has already been tested in other studies that observed changes in the consumer choice behavior. On the evaluation of the effectiveness of the material, the seven specific questions related to the attributes of nutrition labeling, answered by 36 patients who completed the study, a significant increase in the percentage of hits in four of them. This average increase was 42.2%.

Conclusion: The elaborate educational material was considered satisfactory and fulfilled its role of assisting the food choices of people with diabetes.
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Results: We diagnosed 41.06% of users as diabetic or pre-diabetic screening. Regardless of the group to which you belong, there was little knowledge about the disease, and negative psychological and emotional adaptation, pointing down user engagement to treatment.

Conclusions: changes are needed in health education focused on diabetes, enabling formation of social consciousness that will motivate positive behavioral changes to patients and to society in general.

A175
Diabetes Diamantina Community: a tool to promote communication and education in diabetes
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A175

Background: Social networking sites (SNS) like Facebook represent a common place to seek information, but very little is known about the representation and use of health content on SNS. In recent yrs., people with diabetes have taken by the millions to diabetes SNS and blogs as well as main stream social media platforms, like Twitter and Facebook, to connect with their peers in ways that were impossible before. However, these sites vary considerably in quality and authenticity of the content, which is dangerous for diabetics.

Objectives: The aims of the study were to evaluate the characteristics of the Diabetes Diamantina, an active Facebook diabetes community, as strategies to improve communication and education in diabetes.

Materials and methods: Diabetes Diamantina Community (DDC) was founded on May 16, 2015. In this exploratory study, we took a sample of all messages posted daily on the DDC during 30 days in May and June 2015 to identify the general characteristics of this community. Messages were created by DDC administrator or shared the Fan Pages of major institutions of diabetes as SBD, ADA, IDF, ADJ and others. Posts were abstracted and aggregated using the Facebook database. Two investigators analyzed the posts and applied the Facebook codes to the data.

Results: The results revealed that the community was international in nature. Its members were from Brazil (50%) and other 44 countries (50%). In the study period, 98 messages were posted on the DDC in Portuguese (n=49), English (n=29) and Spanish (n=20) languages. The number of participants was increasing steadily with 664 "Likes" and a "total reach" of 10,141 users of Facebook. Among participants, the large majority (78%) were gender female, and (53%) with age group between 18-34 yrs. old. The community was shaped as a social network where peer users share

Concerning insulin administration and storage, glucose monitoring, response to hypo and hyperglycemia and foot care. For each question, patients scored from 0 (no knowledge) to 10 (full knowledge). After intervention, 64 (66%) were reevaluated with the same questionnaire. The major reasons for no reevaluation were discharge during weekend and discharge without notification.

Results: At baseline (n=92), patients highly scored the importance of diabetes care (average score: 9.2±2) and glycemic control (7.8±3) but recognized a lower level of knowledge about DM (6.2±3), nutrition (6.8±3), physical activity (6.3±3) and medications (6.4±4). For those 80 on insulin, there lower scores for knowledge about insulin administration (6.2±4) and storage (5.7±4), glucose monitoring (6.6±4), response to hypoglycemia (6.5±3) and hyperglycemia (5.9±3). For patients evaluated before and after education, scores were described below (Figure 1).

Conclusion: By performing a structured evaluation, we documented an improvement in diabetes knowledge of hospitalized patients. Besides every patient has some knowledge of the disease, after the education guided by the question form, all patients increase their grades for each subject.

A174
Diabetes mellitus: knowledge and attitudes, collaborating for individual and social development of a reef community
Tereza Cristina Pinho Paes Barreto*, Amanda Pinho Paes Barreto, Joseli Reis, Rozângela Amarim Santos Pronto Socorro Cardiológico de Pernambuco, Recife, Brazil
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A174

Background: The treatment of diabetes requires patient compliance, based on positive measures, inserted in social development.

Objective: To compare the level of knowledge and the psychological adjustment to diabetes mellitus users of the Family Health Unit.

Method: A prospective, cross-sectional, quantitative study, with comparison groups, carried out between June-August 2012 included 207 users of the Family Health Unit Finch Low, divided into three groups according to Results of glycated hemoglobin, analyzed by standard American Diabetes Association. The sample was divided into three groups as users were diabetic treated in the unit (group A=53); newly diagnosed diabetics in the unit (group B=85) and non-diabetic patients (group C=69). The collection tools included demographic information, anthropometric and related to the disease, the questionnaire of knowledge about diabetes (DKN-A) and psychological and emotional attitudes towards disease (TA-19). As well as adherence to behaviors related to individual and social development. The variables were organized using SPSS version 17.0 software and analyzed with the Student t test, Kolmogorov-Smirnov and chi square, at 0.05 significance level.

Results: We diagnosed 41.06% of users as diabetic or pre-diabetic screening. Regardless of the group to which you belong, there was little knowledge about the disease, and negative psychological and emotional adaptation, pointing down user engagement to treatment.

Conclusions: changes are needed in health education focused on diabetes, enabling formation of social consciousness that will motivate positive behavioral changes to patients and to society in general.

Figure 1(abstract A173) Scores for patients evaluated before and after education

Table 1

<table>
<thead>
<tr>
<th>Question</th>
<th>Before</th>
<th>After</th>
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<tbody>
<tr>
<td>Importance of DM care</td>
<td>9.2±2</td>
<td>9.3±1</td>
</tr>
<tr>
<td>Glycemic control</td>
<td>7.1±6</td>
<td>7.7±2</td>
</tr>
<tr>
<td>Knowledge of DM</td>
<td>6.0±2</td>
<td>7.1±2</td>
</tr>
<tr>
<td>Nutrition</td>
<td>6.5±3</td>
<td>8.2±2</td>
</tr>
<tr>
<td>Physical activity</td>
<td>5.8±3</td>
<td>5.8±3</td>
</tr>
<tr>
<td>Medications for DM</td>
<td>6.1±3</td>
<td>7.2±2</td>
</tr>
<tr>
<td>Insulin administration</td>
<td>5.3±4</td>
<td>5.3±4</td>
</tr>
<tr>
<td>Insulin storage</td>
<td>5.4±4</td>
<td>5.4±4</td>
</tr>
<tr>
<td>Glucose monitoring</td>
<td>6.2±4</td>
<td>6.2±4</td>
</tr>
<tr>
<td>Response to hypoglycemia</td>
<td>6.0±3</td>
<td>5.8±4</td>
</tr>
<tr>
<td>Response to hyperglycemia</td>
<td>5.3±2</td>
<td>7.3±3</td>
</tr>
<tr>
<td>Influence of diet/exercise on DM</td>
<td>5.8±4</td>
<td>5.8±2</td>
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Table 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Average</th>
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<tr>
<td>Anthropometric</td>
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</tr>
<tr>
<td>Nutrition</td>
<td>6.8±3</td>
</tr>
<tr>
<td>Physical activity</td>
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<tr>
<td>Medications for DM</td>
<td>6.2±3</td>
</tr>
<tr>
<td>Insulin administration</td>
<td>6.0±2</td>
</tr>
<tr>
<td>Insulin storage</td>
<td>5.4±4</td>
</tr>
<tr>
<td>Glucose monitoring</td>
<td>5.7±4</td>
</tr>
<tr>
<td>Response to hypoglycemia</td>
<td>6.5±3</td>
</tr>
<tr>
<td>Response to hyperglycemia</td>
<td>5.9±3</td>
</tr>
<tr>
<td>Influence of diet/exercise on DM</td>
<td>5.8±4</td>
</tr>
</tbody>
</table>

Table 3

<table>
<thead>
<tr>
<th>Variables</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge about DM</td>
<td>6.2±3</td>
</tr>
<tr>
<td>Nutrition</td>
<td>6.8±3</td>
</tr>
<tr>
<td>Physical activity</td>
<td>6.3±3</td>
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<tr>
<td>Medications for DM</td>
<td>6.2±3</td>
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<tr>
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<td>5.8±4</td>
</tr>
<tr>
<td>Influence of diet/exercise on DM</td>
<td>5.8±4</td>
</tr>
</tbody>
</table>

Figure 1

Score for patients evaluated before and after education

Conclusion: By performing a structured evaluation, we documented an improvement in diabetes knowledge of hospitalized patients. Besides every patient has some knowledge of the disease, after the education guided by the question form, all patients increase their grades for each subject.
health content, social support, report personal experience, cultivate companionship, and exert social influence.

**Conclusion:** Over time, new technologies are likely to emerge and, with them, new and creative ways for patients to connect will become available. DDC can improve diabetes education and can provide a forum for reporting personal experiences, asking questions, and receiving direct feedback for people living with diabetes in different countries. Based on the positive results, we discussed future directions for research of the DDC in a highly connected world.

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**A176**

**Evaluation of the insulin administration technique in a tertiary hospital**

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*Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A176

**Background:** Optimizing glycemic control is important to minimize the risk of macro and microvascular complications in diabetes. Therefore, it is important that patients under insulin treatment know the correct technique for insulin self-administration to ensure proper management.

**Objective:** Assess whether patients with longstanding diabetes followed in a tertiary hospital know how to correct self-administer their insulin.

**Materials and methods:** Cross sectional study consisting on the application of a questionnaire about the procedures of insulin self-administration to 100 patients treated at a tertiary type 2 diabetes mellitus unit. The questions assessed time of diabetes, types of insulin used, total insulin dose, comorbidities and use of other drugs. There were also specific questions about the technique of insulin self-administration according to guidelines of the Brazilian Diabetes Society.

**Results:** Of 100 patients evaluated, 50% were female, mean age 61.54 yrs. (range 35 – 86 yrs.). The mean disease duration was 18.52 yrs. (2 – 40 yrs.). Most patients learned how to apply insulin with a nurse (48%), 17% were instructed by a doctor and 27% could not remember. All but 2 patients used drugs other than insulin. As for type of insulin, 80 patients (80%) used human insulin, most of them (61%) three injections a day and 76% mixed the two types of insulin in the same syringe. The 100 cc, 50 cc and 30 cc syringes were used by 59%, 27% and 5% of patients, respectively, reflecting the greater distribution of 100 cc syringes by basic health units. The mean total insulin dose was 77.72 IU (8-212 IU). Regarding the 20 specific questions on insulin administration technique, the mean number of correct answers was 9.87 (6 – 13).

**Conclusion:** This study shows that even in a tertiary hospital there is a high rate of mistakes in insulin self-administration, which may be associated with poor glycemic control and an increased incidence of diabetes complications, including hypoglycemia. Thus, it is important that all health care professional actively inquire how the patients routinely administer their insulin, since diabetes is a chronic disease that requires a continuous educational process.

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**A177**

**Illiteracy and diabetes: educational program for people with type 2 diabetes in the public health system**

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*Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A177

**Background:** Diabetes (DM) is a public health problem in Brazil and illiteracy is an obstacle in controlling the disease, with this population often not answered properly in Public Health System (PHS).

**Objective:** To develop and evaluate educational material to people with type 2 diabetes with limited health literacy or illiteracy, attended by PHS.

**Materials and methods:** Educational material was prepared with pictures of food and portion sizes, corresponding to eating plan and based on calories and food groups and list of drugs identified by different colors. Health literacy was measured with the brief-form Test of Functional Health Literacy (B-TOFHLA) in 53 patients with type 2 DM in a single Public Health Center in Belo Horizonte-MG. Educational program was conducted in four weekly meetings, in groups with 10 people, directed to use of drugs and nutrition, advising how to identify drugs by different colors, guiding meals with an individualized eating plan and a list of food adapted to this reality. The meetings were based on educational material. Clinical evaluation and biochemical tests were analyzed before and three months after the last meeting.

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**Figure 1(abstract A176)** Results of the questionnaire

![Figure 1(abstract A176)](image-url)
Results: Forty patients were included in the study, classified as inadequate or marginal health literacy. At 3 months, there were improvements in fasting glucose (p < 0.005), A1C (p < 0.018), total cholesterol (p < 0.006) and LDL cholesterol (p < 0.014) and reduction in systolic (p < 0.005) and diastolic (p < 0.018) blood pressure. There were no changes in weight, BMI and abdominal girth or in dose of medication and level of physical activity throughout the study.

Conclusion: The clear and simple language of the educational material proved to be feasible in primary care with the changes of behavior in patients with type 2 DM illiterate and functionally illiterate, generating greater control of this condition. Diabetes educators must recognize that inadequate literacy is common and that diabetes care can be even more challenging for this group.

A178
Integrated actions of assistance to the diabetic patient
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A178

Background: WHO alerts to the epidemic behavior of diabetes (DM): more than 190 million people worldwide suffer from diabetes and this number will double by 2030 (Brasilus, 2014). In Brazil, IDF estimated in 2014 that the number of diabetics was 11.6 million. Aging, urbanization, sedentary lifestyle, high fat diet and obesity are seen as responsible for this situation. In addition to the cost of treatment, complications of the syndrome, overtax and overwhelm the health care system. Thus, only public policies are insufficient, being essential the efforts of researchers and health teams to carry out projects for the guidance of the population, who often have no basic knowledge, compromising the effectiveness of treatment.

Objectives: Carry out actions, especially for the elderly, involving students in the selection and placement of information about etiology, symptoms, diagnosis, treatment, side effects and drug interactions of DM.

Materials and methods: This project is part of an extension program with continued actions, involving 20 volunteers students, per event, and Uninorte and UFAM teachers. The activities have multivariate approaches, are cyclical and redundant, ensuring maximum participants. In the first half of 2015, the subjects were: pharmaceutical and nutritional guidance, physical activity and risks of alcohol consumption and smoking. Diabetic people interested in the Monitoring Group, scheduled for Sep/2015, were registered. These people will receive glucometer and a data collection form for monitoring capillary blood glucose and receive guidelines. Also will be offered, the molecular test for the registered ones with a possible diagnosis of MODY 2 or 3 (Ethical approval n° 923 744).

Results: The activities took place in the Dr. Thomas Foundation and Senior Park/Vieiralves, Manaus, AM. 70 people were served. Of these, 4 diabetic female, have registered. The accession of the elderly, especially women is a goal, as they generally are more receptive to information,
make appropriate medical monitoring, influencing your partner and being an example to children and grandchildren.

**Conclusion:** The project confirms the importance of university extension for the formation of a professional who recognizes in their proactive actions a way to benefit the community. The exchange of experiences promote changes in habits and learning, whose expected benefit is to prevent and/or minimize the complications of diabetes by improving the quality of life.

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**A179**

**Nutrition education in type 2 diabetic patients: comparison of individual and collective care**

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**Diabetology & Metabolic Syndrome** 2015, 7(Suppl 1):A179

**Background:** Individual care has helped health educators to recognize the needs of each patient, ensuring the achievement of established goals.

Collective care has been related to the cost benefit and it has enabled positive psychosocial effects.

**Objective:** To compare two groups with individual care (Group 1) or collective care (Group 2), by using the same approach techniques in nutrition to assess compliance with nutritional recommendations.

**Materials and methods:** 31 patients with type 2 diabetes were selected irrespective of gender, aged 40 to 75 yrs. and the mean duration of disease was 10 yrs. Patients were randomly separated into two groups, individual (group 1) or collective care (group 2). All patients attended a total of six meetings. First meeting was individual and consisted of signing Informed Consent Agreement, Biochemical tests (fasting glucose, glycated hemoglobin, total cholesterol and fractions, triglycerides), anthropometric data (weight, height, BMI and waist circumference) and questionnaire to assess dietary habits and knowledge about healthy diet for managing diabetes. During the second and fourth meetings patients was provided with information on diabetes and nutritional intakes. Subjects received a booklet with summary of the topics. The patients were asked to prepare questions based on the nutrition education for discussion. In the third and fifth meeting a discussion was performed using booklets and daily diet of each participant. The last meeting consisted of reevaluation of the data.

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**Figure 1(abstract A179) Comparison of individual care (Group 1) and collective care (Group 2) before and after the study**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Before Mean (standard deviation)</th>
<th>After Mean (standard deviation)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>58.5 (10.7)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Disease duration</td>
<td>12.4 (7.9)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Height</td>
<td>1.6 (0.1)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Weight</td>
<td>80.8 (18.0)</td>
<td>81.3 (18.7)</td>
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<td>BMI</td>
<td>31.1 (4.8)</td>
<td>31.2 (4.9)</td>
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<tr>
<td>Waist circumference</td>
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<td>102.7 (14.6)</td>
<td>0.758</td>
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<tr>
<td>Fasting glucose</td>
<td>142.2 (70.9)</td>
<td>149.3 (54.1)</td>
<td>0.721</td>
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<tr>
<td>A1C</td>
<td>7.9 (1.5)</td>
<td>7.8 (1.3)</td>
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<tr>
<td>Total cholesterol</td>
<td>194.69 (39.3)</td>
<td>190.2 (33.5)</td>
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<tr>
<td>HDL</td>
<td>48.7 (13.8)</td>
<td>51.7 (19.6)</td>
<td>0.358</td>
</tr>
<tr>
<td>LDL</td>
<td>104.8 (30.2)</td>
<td>102.2 (24.4)</td>
<td>0.959</td>
</tr>
<tr>
<td>VLDL</td>
<td>38.5 (20.3)</td>
<td>36.6 (18.3)</td>
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<td>Triglycerides</td>
<td>208.3 (98.7)</td>
<td>186.9 (96.9)</td>
<td>0.152</td>
</tr>
</tbody>
</table>

**Wilcoxon test - significance of 5%**

**Figure 1(abstract A179) Comparison of individual care (Group 1) and collective care (Group 2) before and after the study**

<table>
<thead>
<tr>
<th>Variável</th>
<th>Before Mean (standard deviation)</th>
<th>After Mean (standard deviation)</th>
<th>P value</th>
</tr>
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<tbody>
<tr>
<td>Age</td>
<td>59.5 (8.5)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Disease duration</td>
<td>12.6 (6.6)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Height</td>
<td>1.6 (0.1)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Weight</td>
<td>78.0 (14.0)</td>
<td>77.1 (14.1)</td>
<td>0.181</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>100.3 (13.8)</td>
<td>98.2 (13.6)</td>
<td>0.002</td>
</tr>
<tr>
<td>BMI</td>
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<td>29.9 (5.6)</td>
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<td>Fasting glucose</td>
<td>138. (39.3)</td>
<td>149.4 (46.9)</td>
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<td>A1C</td>
<td>8.1 (1.3)</td>
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<td>0.074</td>
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<td>Total cholesterol</td>
<td>173.2 (29.7)</td>
<td>168.0 (38.3)</td>
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<tr>
<td>HDL</td>
<td>59.8 (18.1)</td>
<td>53.2 (16.3)</td>
<td>0.069</td>
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<tr>
<td>LDL</td>
<td>86.8 (24.2)</td>
<td>88.9 (24.6)</td>
<td>0.268</td>
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<tr>
<td>VLDL</td>
<td>26.6 (15.2)</td>
<td>25.6 (15.9)</td>
<td>0.711</td>
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<tr>
<td>Triglycerides</td>
<td>133.0 (76.0)</td>
<td>128.6 (79.2)</td>
<td>0.733</td>
</tr>
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</table>

**Wilcoxon test - significance of 5%**
collected at the beginning. All the meetings with individual care followed the same characteristics of education in diabetes used with collective care. Wilcoxon test was used for statistical analysis.

Results: There was no significant difference between Group 1 and Group 2 regarding biochemical parameters, weight and BMI after the intervention (Figure 1). In the questionnaire of dietary habits, Group 1 and Group 2 have shown significant differences to perceptions of healthy eating (p=0.045 and p=0.025, respectively) (Figure 2). In Group 2 the reduction of waist circumference varied significantly (p=0.002) after the intervention (Figure 3).

Conclusion: Nutrition education has been a positive impact on the treatment of diabetic patients and an important tool for health professionals.
as a supporter for primary health care professionals. After the meeting was conducted a qualitative study to assess the perception of the primary care professionals about sharing patient care with the endocrinologist.

**Results:** Participants included 22 primary care professionals. In the first stage of the meeting, most professionals reported difficulties and lack of technical preparation to deal with diabetic patients who require insulin, even in one per day insulin application. This lack of capacity reflected in the numerous referrals to the endocrinologist of primary health care diabetic patients. After the second stage of the meeting, with the clinical case discussion with the endocrinologist, the primary care professionals reported increased security in the diabetic patient care and reported that work together with the specialist has benefits for both the patient and for the professionals. Furthermore, reported that this support partnership has the potential to reduce the number of unnecessary referrals and improve the quality of diabetic patient care without transferring the responsibility of the primary health care professionals.

**Conclusion:** The participation of the endocrinologist as a support to primary health care professionals increases the general practitioner capacity to solve problems, the better use of referrals and the opening of an inter-professional communication channel, whose major beneficiary will be the diabetic patient. Advantages of an intercommunication channel between the endocrinologist and professional attention to primary health.

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**A182**

Impact of group educational actions on diet and quality of life of individuals with diabetes type 2

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A182

**Background:** Diabetes mellitus (DM) is a chronic complex disease that requires continuous medical care. Nutritional therapy is part of any education program DM and contributes to the achievement of good glycemic control. The current scientific literature shows that educational interventions, especially those based on group strategies are effective on the improvement of results concerning the disease treatment.

**Objective:** Evaluate through an education program the impact of group educational actions on diet and quality of life of individuals with diabetes type 2 (DM2).

**Materials and methods:** This is a prospective clinical trial with 43 patients diagnosed with DM2 at least one month prior to this study. These patients were age 18 yrs. or over, users of private health care insurance. The subjects were individually evaluated before and after participation in an education program, which had five weekly meetings, lasting about an hour and 30 min each. Data collected were socio-demographic and clinical, along with weight, body mass index (BMI), waist circumference (WC), food consumption data (24-hour dietary recall – food frequency questionnaire) and quality of life (BPAID – Brazilian version of PAID scale). Shapiro Wilk test was used to evaluate normality and afterwards the T Student, Wilcoxon, Mann Whitney tests and Kruskal Wallis.

**Results:** There was a significant decrease in BMI and WC (p<0.001). Nutritional assessment revealed an increase in the number of meals (p=0.006) as well as reduction energy intake, carbohydrates, proteins, lipids and saturated fat (p<0.05). The 24h recall revealed increased number of food (p=0.006), and reduction in energy intake, carbohydrates, proteins, lipids and saturated fats (p<0.05) (Figure 1). Food frequency questionnaire showed significant increase on frequency of weekly intake fruit, vegetables and salad (p<0.05). It showed a significant increase in burgers and sausages, fried foods, cookies and crackers, candies and soft drinks (p<0.05) (Figure 2). Finally, the general score of BPAID scale showed a significant improvement in quality of life (p<0.001) after intervention (Figure 3).

**Conclusion:** A nutrition intervention strictly based on education in group strategies was effective in improving participants’ physical conditions, pattern of food consumption and the quality of life in relation to diabetes. This intervention model may allow for more efficient and cost-effective methods in diabetes education programs.

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**A183**

Education in diabetes mellitus with focus on social support: longitudinal study

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A183

**Background:** Education in diabetes mellitus is an ongoing process to promote/encourage the acquisition of knowledge on self-care skills and control of the disease and this process can be facilitated by social support from family. The literature shows the benefits of educational interventions
Figure 1 (abstract A182) Energy consumption, carbohydrate, protein, lipid and saturated fat before and after dietary intervention in a group of 43 patients who completed the nutrition education program, Belo Horizonte, 2015

Figure 2 (abstract A182) Food frequency questionnaire before and after dietary intervention in a group of 43 patients who completed the nutrition education program, Belo Horizonte, 2015
for people with diabetes mellitus, however, there are few studies on its long-term effects. Objective: To assess the effectiveness of educational interventions focusing on social support after two yrs. of its completion.

**Method:** Quantitative/longitudinal study whose data before (T0) and after 12 months (T12) came from a clinical trial in which participants were given educational interventions through the “Conversation Maps in Diabetes”, tool and there was involvement of the family through an Intervention Group, done by phone calls. The third collection (T36) of data was from the population (N=164) that participated of clinical trial. The variables of interest was the knowledge of the disease/care, evaluated by “Diabetes Knowledge Scale” (DKN-A) validated in Brazil, and glycemic control assessed by glycated hemoglobin value obtained in electronic medical records. In the statistical analysis we used the nonparametric ANOVA for repeated measures.

**Results:** Of the 164 participants (82 of the Intervention and 82 of the Control Group), 95 (50 and 45 respectively) were interviewed. There were differences in the values of knowledge (p-value=0.0004) and glycated hemoglobin (p-value=0.0001) in the studied time (Figure 1).

**Conclusion:** The highest score of knowledge was at T12 in both groups, with a reduction in T36, reiterating the importance of education as an ongoing process. As for glycemic control, family social support seems to have influenced the maintenance of results.

**Reference**

**A184**

**Cross-cultural adaptation and validation of the original “diabetes basic knowledge test” (DBKT) into Brazilian-Portuguese version**

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A184

**Background:** To provide a reliable, validated, and culturally adapted instrument that may be used in evaluating the knowledge about diabetes in Brazilian health professionals.

**Materials and methods:** The cross-cultural adaptation process of the original The Diabetes: Basic Knowledge Test (DBKT) into Brazilian-Portuguese was conducted using an appropriated guideline. First were made two translations, synthesis and back translation. The expert committee contributed on several steps. For validation, the adapted version was applied in a prospective longitudinal study to 105 health professionals with experience in education in diabetes mellitus less than six months and/or professional course carrier or expertise in education in diabetes. Internal consistency, reliability, and measure validity were assessed. Sample was predominantly made up of women (83.8%), aged between 22 and 67 yrs. (34.7±9.6 SD), with greater participation of nutritionists (42.9%), followed by doctors (20%) and nurses (18.1%). The adapted version of DBKT instrument has 41 items measured with a score of one (1) to the correct answer and zero (0) to incorrect. There is only one correct answer for each item.

**Results:** About psychometric properties, the principal component analysis was conducted on 41 items of the instrument with orthogonal rotation (VARIMAX). The measure of Kaiser-Meyer-Olkin (KMO=0.604) verified the sample adequacy for analysis. Sphericity test of Bartlett (chi-square (104) =1386.12, p<0.001) indicated that the correlations between items are sufficient to perform the factor analysis. Cronbach’s alpha value of the cross-culturally adapted Brazilian-Portuguese version of the DBKT was 0.81. The extraction criterion of the factors adopted by this study was the screeplot. This factor analysis, extracted from two factors, being Factor 1 (30 items) and Factor 2 (11 items). The mean of correct answers was 29.9 ±5.8 SD (maximum score: 41). About the Domain 1 was observed the mean was 20.9±5.1 SD (maximum score: 30). For Domain 2 the mean was 9.0±1.5 SD (maximum score: 11). Was not observed mean difference of the total scores for gender (p=0.58) and professional category (p=0.16).

**Conclusion:** A well-established guideline resulted in a culturally adapted Brazilian-Portuguese version of the DBKT, tested and validated on a sample of Brazilian population, and proved to be a valid and reliable instrument for assessing the knowledge about diabetes in Brazilian health professionals.

**Figure 1(abstract A183)** Knowledge about the disease and glycated hemoglobin. Ribeirão Preto, 2015
**A185**

Young leaders doing diabetes education in a school

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A185

**Background:** Although type 1 diabetes mellitus (DM) is one of the most common chronic diseases in children, school staff and students know very little about it. Most of what they know are misconceptions, like: “the person who has it cannot eat sugar”, or “it is a disease of old people”. Due to this lack of knowledge, they sometimes refuse to have students with DM, to assist them with their self-care routine, or are unable to help in an emergency. One of the Brazilian Young Leaders in Diabetes (YLD) made, as its conclusion YLD Training project, a diabetes information campaign in his former school.

**Materials and methods:** In addition to the speech in 6 classrooms (126 students, grades 8th-12th, ages between 13 and 17 yrs., 44% boys and 56% girls), 4 pamphlets were made and placed on the school doorboards (about: hypoglycemia, DM symptoms, and invitation to the speech). A questionnaire was used before and after the speeches. It contained multiple choice questions about: existence of a family member with DM; appropriate help for someone with DM who is shaking, dizzy, pale and nervous; frequency of sports practice; behaviors that help in preventing type 2 DM; if it is possible to cure DM or not; and if he/she had DM. There was also an open-ended question about DM symptoms. Wilcoxon signed rank test with the continuity correction was used to compare the pre- and post-speech number of right and wrong answers to each question.

**Results:** There was only 1 student with T1D. Most of them (63%) reported to have a family member with DM (20% no family member with DM, and 17% did not know). In addition, 49% practice physical activity 3 or more times a week, 29% only once a week, and 22% do not practice. The 4 questions compared pre- and post-speech presented significant difference in terms of higher number of correct answers after the speech, all of them with a p-value < 0.001.

**Discussion:** Our objectives were partially achieved, since after the speech most of the students, but not all, answered correctly the questions about hypoglycemia correction (percentage of right answer pre- and post-speech: 21% and 64%), type 2 DM preventive behaviors (62% and 78%), diabetes symptoms (10% and 71%), and DM possibility of cure (49% and 91%).

**Conclusion:** We believe that led by a Young Leader the project may be more effective, because the connection with someone from a closer age group and language may enhance students’ interest.

**A186**

Knowledge of inpatient diabetes among sixth-year medical students

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A186

**Background:** The importance of proper management of inpatient hyperglycemia is increasingly being recognized. However, the curriculum for medical school has lagged behind current clinical recommendations. **Objective:** The aim of this study was to assess the knowledge of medical interns on inpatient diabetes.

**Materials and methods:** The questionnaires were given on inpatient diabetes. It was the same previously applied in Lansang study with adaptations for the Brazilian reality. Descriptive analysis was used. The test was administered to 44 intern medical students, with an error margin of 5% and a 95% confidence level.

**Results:** 82% of students performed the initial management of acute coronary syndrome correctly. However, only 68% of them hit the proper management of diabetes in the same patient, 18% of students opted for the maintenance of oral antidiabetic during hospitalization. In another patient assessed with COPD only 23% of students indicated insulin properly, another 43% recommended the sole use of regular insulin in sliding scale for diabetes management and about 36% did not initiate any form of treatment. Hyperglycemia in patients not known to have diabetes is less likely to be recognized.

**Conclusion:** This study demonstrates the gaps in knowledge about inpatient diabetes that exist in medical school. The findings can be used to design a curriculum appropriately targeted to the level of 6th medical students.

**A187**

Relationship between the education level and dermatological lesions in feet of diabetic patients

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A187

**Background:** Diabetes mellitus is a heterogeneous group of metabolic disorders that result in hyperglycemia by defects in insulin secretion or action, or both. This disease has a direct association with long-term damage to the body, including vascular disease and peripheral neuropathy, increasing the risk of foot ulcers and amputations. There are several risk factors that contribute to the development of diabetic foot ulcers, such as the duration of the disease, uncontrolled metabolism and the mishandling of the foot. Effective health actions related to education about the disease and, more specifically, on the diabetic foot may avoid or delay diabetic foot ulcers.

**Objectives:** To characterize the most common dermatological lesions on the feet of diabetic patients of endocrinology service in a university hospital and its relationship to the level of education.

**Materials and methods:** A descriptive, retrospective study from data collected during the execution of the extension project in the period of 2014 to 2015. The Patients who agreed to participate in the project underwent a targeted physical examination seeking to identify and characterize dermatological lesions present in their feet.

**Results:** Among the 175 covered diabetic patients, 125 (71.4%) were female. The average age was 57.2±12.4 yrs., with 60% of patients under 60 yrs. About the education level, 5.1% said they had never been to school and 47.4% did not conclude elementary school. The dermatological examination revealed the presence of skin lesions on the feet in 94.3% of patients addressed. Patients with lower education had higher number of lesions per person (average of 1.92 lesions) compared to patients with completed secondary education (average of 1.54 injuries). Among the dermatological changes that stand out are xerosis (35.4%), onychomycosis (46.5%), fissures (33.7%), and the calluses (14.2%). Only 5.7% had no lesions. The most frequent associations were xerosis and fissures. The amputation occurred in 5 (2.9%) patients.

**Conclusion:** It can be concluded that is high the frequency of risk conditions for the development of ulcerations in the population assisted by the project and the low level of education can be a contributing factor to this situation.

**A188**

“Education with art”: diabetes education through theater

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**Background:** How can we best engage the age group of 10 to 17 year olds to increase their awareness and knowledge of diabetes? Trying to solve this challenge, we started this project in a public hospital 5 yrs. ago in an unprecedented manner.

**Objectives:** To improve adhesion of preteens and teens to the treatment of diabetes using theater techniques.

**Materials and methods:** Longitudinal study, with the participation of 24 young people with diabetes type 1 (DM1) between 10-17 yrs. old.
The acting classes are biweekly lasting, for 3 hrs., aiming to improve the expressions of feelings and at the same time the body language, as a way of working possible psychological barriers in the adherence to diabetes treatment. The program covers topics on diabetes (based on a Education Program) that are discussed through games and activities to increase the interest and reduce stressful situations. At the same time, is carried out a support group for parents with a psychologist. At the end of a year the group presented a play whose theme was based on the comics Uncle Julian. A simple and fun language provides a method of learning about various topics on diabetes in a playful manner.

Results: The mean age of participants is 14.5 yrs. history of diabetes of 6.5 yrs. Glycated hemoglobin levels were measured (HbA1C) before and after each 3 or 4 months with an average drop of 1.2% in the group after 12 months. Among the subjects, “diet” was one of the most discussed.

Conclusions: This challenging and unique project that uses theater as a form of diabetes education has achieved its main objective in relation to a better glycemic control and adherence to treatment in the group of young people with DM.

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A189

Reuse of disposable syringes and needles in patients with type 2 diabetes


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Background: Despite the recommendation of manufacturers for single-use of syringes and needles for insulin administration, most patients reuse these devices, a practice supported by national guidelines.

Objectives: To estimate the frequency of needles and syringes reuse for insulin administration by patients with type 2 DM. In addition, to review patients’ practices related to insulin administration.

Materials and methods: Cross-sectional study in an emergency department of a public hospital, in Porto Alegre, Brazil. We assessed sociodemographic and clinical variables related to the management of diabetes; physical examination was performed to evaluate the presence of lipodystrophy, injection site infection and hematomas.

Results: From October 2014 to January 2015, we included 28 participants. Fifteen (54%) were female, average age was 67 (SD 14) yrs. and average BMI was 30 kg/m2 (SD 8). Household monthly income was less than R$ 1.000 (US$ 317) for 68% of the participants. Median time of insulin therapy was 10 yrs. (range 6 to 20 yrs.); 23 (74%) self-administered insulin injections. Twenty-seven (96%) participants receive needles, syringes and insulin from public health system. Reuse of disposable syringes and needles was reported by 75% of participants. The frequency of re-utilization of needles and syringes ranged from two to 21 times; the median re-use frequency was three (IQR 3 to 7.5). Main reasons for syringe and needle changes was pain (54%), guidance of a health professional (14%) and blunt needle (14%). Twenty-two subjects (79%) reported not having received any guidance from a health professional regarding the reuse of needles and syringes. Only 16 (57%) of the participants disinfect with alcohol for reuse. Insulin-administration was reported by 26 (93%) subjects. Although not recommended, twelve (43%) disinfect the needle with alcohol for reuse. Needlesticks injuries due to syringes and needles reuse were reported by 13 (46%) participants. Lipohypertrophy was present in two (7%), hematomas in five (18%), and one subject had injection site infection at the time of the evaluation.

Conclusion: Reuse rates are high and complications, such as lipohypertrophy and hematomas, are frequent. However, most participants had not received adequate guidance on syringes and needles re-utilization. It is important that healthcare professionals provide adequate guidance for patients with type 2 DM that are likely to reuse syringes and needles.

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A190

Characteristics of type 1 diabetes patients during first visit at Hiperdia Minas Center, Viçosa, MG

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Background: The Hiperdia Minas Center in Viçosa aims to attend patients with chronic diseases such as hypertension, cardiovascular disease, diabetes mellitus and chronic kidney disease, referred by the Primary Healthcare Assistance. Thus, it is important to know the type 1 diabetes patients’ profile of this Center in order to promote self-care actions.

Objectives: Describe the profile of all type 1 diabetes patients first attended by the Hiperdia multidisciplinary team.

Materials and methods: All type 1 diabetes patients attended by the Hiperdia Minas Center were enrolled at the study, except for pregnant women. The data were collected from medical records at the first attending. At this first visit, the patients were attended by a physician, nutritionist, pharmacist, nurse, psychologist, physiotherapist, and social worker. Socioeconomics, anthropometrics, biochemistry and clinic data were assessed. Qualitative data were described as absolute and relative frequency, and the quantitative data as median, minimum, and maximum values.

Results: At the time of the study, 72 type 1 diabetes patients had the first visit at the Center. Out of these 54.2% were women. The minimum age was 3 months old, and the maximum 57 yrs. old. The median age was 20 yrs. old. Regarding nutritional status, 8.3% of the patients were obese; 22.2% were overweight or at risk of overweight; 65.3% were normal weight, and 4.2% were low weight. The median diagnosis time was 4 yrs.; the maximum time was 30 yrs., and minimum 6 days. The majority of the patients reported being single (72.2%), having income below 1 minimum wage (37.5%), and less than 12 yrs. of study (84.8%). Also, the majority of patients is not alcoholic or smoker, and almost 50% did not practice physical activity. Regarding insulin type, the majority of the patients were using NPH or NPH + regular insulin (88.9%), did not have comorbidities (84.7%) and showed glycated hemoglobin above 7% (87.5%).

Conclusion: It was observed that type 1 diabetes patients attended at the Hiperdia Minas Center are heterogeneous, showing the need to adapt the self-care promotion actions according to the patients’ characteristics in order to favor more adhesion to the treatment.

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A191

Epidemiological profile of diabetics who died in Brazil from 2008 to 2012

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A191

Background: Brazil has a high prevalence of Diabetes Mellitus (DM) and this disease is known to responsible for an increase in mortality.

Objective: To determine the epidemiological profile of patients with DM who died in Brazil in the period correspondent to 2008-2012, using information available at the DATASUS data bank.

Materials and methods: The Mortality Information System of the DATASUS data bank (Ministry of Health-Brazil) was accessed in order to allow the analysis of the following variables related to subjects with DM: age, gender, race, marital status, degree of education, type of DM, place of demise, and country region and Federation state where the casualty was reported.

Results: According to the analysis of the DATASUS databank, 30,163 death certificates from 2008 to 2012 revealed that the deceased had the diagnosis of DM. More than half of them were women (56.33%) and
Caucasians (53.58%). Regarding their marital status, more than a third of them were married (39.65%). Most deaths happened in type 2 diabetics (66.82%), achieving a proportion of 2.01 deaths of patients with type 2 for each one with type 1 DM. Most deaths occurred during a hospitalization period (65.29%), but a significant percentage of patients died at home (27.52%). In addition, fewer casualties happened in other Health institutions (4.04%), other settings (2.12%), and even on the streets (0.89%), while in 0.14% the place of demise was ignored. The deaths concentrated in the older age groups: 77.83% occurred in patients aged 60 yrs. or older (60-69 yrs.=22.12%; 70-79 yrs.=27.81%; 80 yrs. and above=27.99%). The majority of the casualties involved patients with severe (22.19%) or few years of formal education (1-3 yrs.=24.87%; 4-7 yrs.=17.82%). The Southeast region of Brazil responded for the greatest number of deaths (33.78%), followed by the Northeast (28.81%) and the South (22.78%), with fewer cases in the North (8.43%) and West Central (6.19%) regions. Among the Federation states, São Paulo had the highest number of deaths (4,702), followed by Paraná (2,807), Rio Grande do Sul (2,763), and Rio de Janeiro (2,548). The epidemiological medical care of the deaths in types 1 and 2 diabetes were similar.

Conclusion: Casualties in Brazilian diabetics concentrated in the Southeast region of the country and in hospitalization settings, involving especially type 2 patients aged 60 yrs. or above with a lower educational profile.

A192
Quality care
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Background: Diabetes mellitus is one of the most common chronic diseases in childhood and adolescence, with increasing incidence. The main focus of its management is to achieve quality care by a multidisciplinary team who also deal with the education of the child and their family. Improvements in the care process usually precede improvements in metabolic control of patients. At its base are the identification, recording and analysis of health care quality markers.

Objective: To evaluate the quality of the care process of the Diabetes Unit at the Pereira Rossell Hospital Center.

Materials and methods: A descriptive, retrospective study, using clinical records of patients monitored at DU between 1/7/2012 and 1/7/2013. The criteria for good quality care were: good nutritional status, adequate pubertal development, lack of hospitalizations, adequate frequency of clinical controls, preventive controls of micro and macrovascular disease, and plexus was associated with DM in 1,167,294 of the diabetics had cataract (0.21%), 1,105,881 presented retinal detachments (0.19%), 1,035,520 had glaucoma (0.18%) and 1,013,679 had amaurosis or subnormal vision (0.17%). A disturbance of the peripheral nerves and plexus was associated with DM in 1,167,294 patients (0.20%). Cerebrovascular accident was present as an associated diagnosis in 2,070,171 hospitalized diabetics (0.39%), arterial hypertension in 1,656,050 (0.28%), acute myocardial infarct in 1,583,107 and atherosclerosis in 1,115,565 (0.19%). Pneumonia, upper airway and skin and subcutaneous infections were present in 6,720,865 diabetics (1.14%).

Conclusion: In the present study using the DATASUS system, the most common comorbidity present in subjects hospitalized due to DM was infection. However, the authors did not consider the DATASUS data bank the ideal source for study of the association between DM and complications since, once the DM is chosen as the diagnosis, the other CID-10 are not concomitantly annotated in a routine basis and consequently are underestimated in the system.

A194
Screening of unusual forms of diabetes might not have been accounted by the Brazilian public health system
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Background: Type 2 diabetes is among the major public health problems of the 21st century and is associated with an alarming rise in the incidence of obesity, spreading fast among youngsters. In adults, it accounts for about 90 to 95 percent of all diagnosed cases of diabetes. However, even being more prevalent, type 2 diabetes is not the only possibility for slim people in this age group.

Objective: The present study aimed to discuss the correct diagnosis in non-obese patients aged 20-39 yrs. classified as having type 2 diabetes mellitus (T2D).

Materials and methods: Epidemiological study based on data obtained from Brazilian System of Registration and Accompaniment of Hypertensive and Diabetic Patients (http://hiperdia.datasus.gov.br). All of the cases diagnosed as type 2 diabetes in 2013-2014 were divided into two age groups and separated into two another 2 groups (obese and non-obese). For statistical analysis, we used the age groups between 20-39 yrs. Data refers to patients monitored by the Program of Health of the Family.

Results: We evaluated 15,468 patients, of whom 7944 were in the obese group and 7524 in the non-obese group.

Conclusion: “Other specific types of diabetes” is a heterogeneous category that refers to unusual forms of diabetes. Traditional examples resulting from specific genetic syndromes (also known as Maturity Onset Diabetes of the Young or MODY), cystic fibrosis, autoimmune, malnutrition, infections, hemochromatosis, surgical causes and drug causes (Figure 1). Altogether
they account for 1-2% of all diagnosed cases of diabetes. Even more important than these uncommon types of diabetes, is the necessary medical knowledge in order to recognize it. Rates of type 2 diabetes are increasing dramatically in Latin American. Currently there is no way to explain the unexpectedly high rates of diabetes in nonobese individuals, which lead many experts to think that these less common forms might be masked as well. To be certain, challenges remain that should not be underestimated. Although all these forms of diabetes identified until now has been responsible for a small fraction in diabetic population, surely will provide in the future the basis in which rests the heterogeneity of diabetes and its long-term complications. More than that: it can also suggest that both autoimmune insulitis and insulin resistance may coexist in parallel and autoimmunity precipitates the onset of hyperglycemia.

A195
Prevalence of diabetes mellitus in Brazil: a systematic review with meta-analysis
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A195
Background: The prevalence of diabetes mellitus (DM) is increasing worldwide. The global prevalence is estimated to increase by about 2.2% per year; however, no data is available to estimate the trends in Brazil over time.

Aims: We developed a systematic review with meta-analysis to estimate the prevalence and trends of DM in Brazilian adults. Materials and methods: Cross-sectional and cohort studies published between 1980 and 2014 were independently identified by two reviewers, without language restriction, in five databases (PubMed, Cochrane Library, EMBASE, LILACS and SciELO). Random effects models were used to estimate the prevalence of DM for the general population, as well as the trends for the last decades. Heterogeneity was assessed by I² statistics. Results: In total, 47 articles were selected and included in this review. Three different patterns for the DM diagnosis were identified: self-report (33 studies), fasting plasma glucose (7 studies), and complex diagnostic (e.g. fasting glucose + OGTT + self-report; 7 studies). A meta-analysis was conducted according to the diagnosis pattern. The prevalence of DM was 11.9% (CI95% 7.2-17.8; I²=100%) by complex diagnosis, 6.6% (CI95% 4.8-8.9; I²=94%) by fasting glucose, and 5.5% (CI95% from 4.9 to 6.2; I²=99%) by self-report. In trend analysis, we observed an increase in the prevalence of DM in studies using a complex diagnostic: 7.4% (CI95% 7.1-7.7) in the 1980’s, 12.1% (CI95% 10.5-13.8) in the 1990’s, 14.5% (CI95% 13.1-16.0) in the 2000’s, and 15.7% (CI95% 9.8-24.3) in the 2010’s. Although with a lower prevalence, similar trends were observed by self-reported diagnosis: 3.2% (CI95% 2.6-4.1) in the 1990’s, 5.7% (CI95% 5.1-6.4) in the 2000’s, and 6.8% (CI95% 5.9-7.9) in the 2010’s. Only one study evaluated the prevalence of diabetes by fasting glucose in the 1990’s (10.3% [CI95% 9.1-11.6]; the other studies were conducted in the 2000’s (6.9% [CI95% 4.2-8.6]). Conclusions: We identified three methods used to access the prevalence of DM in epidemiological studies in Brazil. Despite the high heterogeneity, studies based on a complex diagnosis showed a high prevalence of DM in Brazilian adults over time (11.9%), with a progressive increase in the last 35 yrs. This trend was also observed in studies based on self-reported diagnosis; however, these findings may be associated with improvement in access to health services in the same period.

A196 Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of neuropathy diabetes score (NDS) compared with the Michigan neuropathy screening instrument (MNSI).

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A196

Background: MNSI is widely used for evaluation of distal symmetric peripheral polyneuropathy (PNP) in individuals with diabetes. In the DCC/EDIC study, the MNSI was validated for screening of signs and symptoms of PPN, presenting, for a cutoff of ≥2.5, sensitivity of 61%, specificity of 79%, positive predictive value (PPV) of 55% and negative (NPV) of 83%, when compared to neurological examination in combination with nerve conduction studies as gold standard.

Objectives: To evaluate the sensitivity, specificity, PPV, NPV and accuracy of Neurophy Diabetes Score (NDS) (≥3.0) compared to MNSI score, used as the gold standard.

Materials and methods: 305 patients with Metabolic Syndrome, Diabetes (type 1 and type 2) were evaluated with MNSI and NDS.

Results: NDS evaluates PPN signals through the thermal, painful and vibratory sensation, and the Achilles reflex. Compared to MNSI, which evaluates the PPN through the appearance of the feet, presence of ulcers, vibratory sensitivity, monofilament and Achilles reflex, NDS had a sensitivity of 50%, specificity of 93%, PPV of 78%, NPV of 79% and accuracy of 79%, according to Figure 1.

Conclusions: When compared to MNSI as the gold standard, the NDS is a good instrument for evaluating presence of PPN, with high specificity, which reduces false positives, and good accuracy, which reflects the test precision.

A198 Data analysis about Diabetes Mellitus and glycemic control collected from screening and prevention campaigns of Chronic Kidney Disease in a community-based service and education

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A198

Background: Chronic Kidney Disease (CKD) has been prominent in the global health scene as important factor of morbidity and mortality among the population, moving large amounts of investments and burdening the health care system with their treatment. In that context, Diabetes Mellitus is a major risk factor, reason why the campaigns also collected data related to that subject. SETTINGS: The LPDR group acts in the prevention of CKD by conducting educational and screening campaigns in different communities of the state.

Objectives: Identify the prevalence of Diabetes Mellitus and CKD, its risk factors and comorbidities in populations of cities in the state of Ceará, diffusing prevention of kidney disease through better understanding of this disease and promoting exchange of experiences between students and community.

Materials and methods: Screening tests for risk factors for DM and CKD were made in more than 7 cities and people were informed about those diseases and how to avoid it. Individuals whose tests showed risk factors were referred for clinical follow-up in health facilities nearby, after being informed about the importance of monitoring their comorbidities.

Results: In the 5 yrs. of work, 3187 people were seen in more than 7 cities (52.8% of them being female). In this population, 33 (1.03%) of individuals who claimed to be healthy were actually possible carriers of Diabetes Mellitus. The data showed that 397(12.45%) had diagnosed DM, and 1534 (48.13%) had family history of DM, 256 (8.03%) had both DM and family history for DM. The data shows that DM is underdiagnosed and poorly controlled in many patients, and that the correct use of anti-diabetic medication is not strictly followed by a significant number of individuals. 213 had diagnosed DM, but had dangerous hyperglycemia (>140) (measured by CBG), and 221 didn’t had diagnosed DM, but had dangerous hyperglycemia. 109 had diagnosed DM and heavily dangerous hyperglycemia (>200). 166 had diagnosed DM and claimed to regularly practice exercises, and 228 had DM but don’t do exercises.

Conclusions: This data analysis shows the urgent need of population education about DM, glycemic control and anti-diabetic medication. It shows that many people claim to be healthy, but are possible carriers of DM or have dangerous or heavily dangerous hyperglycemia. It also shows that many people with diagnosed DM doesn’t know about the correct use of anti-diabetic medication.
The analyzed population was in Hardy-Weinberg equilibrium and investigated the main barriers for glucometer utilization to consider the rarity of the CC genotype. We suggest not to use only questionnaires to define the presence of neuropathy symptoms score, diabetic neuropathy score and esthesiometry. Random stratification was performed considering gender and geographic regions (downtown, north, south, east, west and other metropolitan areas). Data were collected by personal interview including anthropometric and socio-demographic data and diagnosis for diabetes, hypertension and obesity (personal/family history). Genomic DNA was isolated from peripheral blood and GIPR SNP genotyping (rs1800437) was performed by PCR-RFLP. Data were analyzed using chi-square and odds ratio (OR), with significance level set at 5%. Two-way ANOVA was used to analyze differences between genotypes and geographic regions. Mann-Whitney test was used for nonparametric variables.

Results: The analyzed population was in Hardy-Weinberg equilibrium and the commonest genotype GG was detected in 162 subjects. The C mutant allele was found in 27% of the population studied, with higher prevalence in men (p=0.006; OR=0.44), in caucasians (p=0.0001; OR=0.28) and in hypertensive subjects (p=0.004; OR=0.40). In the north region, low prevalence of the C allele was observed (p<0.05). No significant associations were found between the SNP and body mass index, obesity, diabetes and family history for metabolic syndrome-related diseases. Conclusion: This study points to a potential role for rs1800437 in hyper tension. Associations with gender and ethnicity were also found in this Brazilian population. Taking into consideration the rarity of the CC genotype, further studies in larger sample sets will be necessary to confirm these results.

A200
GIPR rs1800437 polymorphism: prevalence and possible associations with metabolic syndrome-related diseases in a Brazilian urban population
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A200

Background: Glucose-dependent insulinotropic polypeptide receptor (GIPR) is mainly found in the pancreatic beta cells but has systemic distribution and function. Some genetic GIPR variants were recently associated with obesity, diabetes and insulin resistance. Few studies had studied the genetic epidemiology of the GIPR, mainly in Europe.

Objective: To determine the prevalence of a specific GIPR single nucleotide polymorphism (SNP) in a Brazilian city population and its association with anthropometric, socio-demographic and clinical characteristics including metabolic syndrome-related diseases.

Materials and methods: This was an observational, descriptive and cross-sectional study. A total of 222 subjects (129 women, 93 men) were recruited from the University Hospital located in a Brazilian metropolitan area (approximately 1,067,214 inhabitants). Random stratification was performed considering gender and geographic regions (downtown, north, south, east, west and other metropolitan areas). Data were collected by personal interview including anthropometric and socio-demographic data and diagnosis for diabetes, hypertension and obesity (personal/family history). Genomic DNA was isolated from peripheral blood and GIPR SNP genotyping (rs1800437) was performed by PCR-RFLP. Data were analyzed using chi-square and odds ratio (OR), with significance level set at 5%. Two-way ANOVA was used to analyze differences between genotypes and geographic regions. Mann-Whitney test was used for nonparametric variables.

Results: The analyzed population was in Hardy-Weinberg equilibrium and the commonest genotype GG was detected in 162 subjects. The C mutant allele was found in 27% of the population studied, with higher prevalence in men (p=0.006; OR=0.44), in caucasians (p=0.0001; OR=0.28) and in hypertensive subjects (p=0.004; OR=0.40). In the north region, low prevalence of the C allele was observed (p<0.05). No significant associations were found between the SNP and body mass index, obesity, diabetes and family history for metabolic syndrome-related diseases. Conclusion: This study points to a potential role for rs1800437 in hypertension. Associations with gender and ethnicity were also found in this Brazilian population. Taking into consideration the rarity of the CC genotype, further studies in larger sample sets will be necessary to confirm these results.

A201
Main barriers on glucometer utilization during physician’s appointment of insulin users T2D patients
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A201

Background: Self-monitoring blood glucose (SMBG) is an important tool for type 2 diabetes treatment, especially for insulin users. However, several patients that receive this device from government do not make the proper use of it.

Objective: Investigate the main barriers for glucometer utilization to evaluate glycemic control of insulin users T2D patients, during physician’s appointment.

Method: Glycemic data was obtained from patient’s glucometers by using Accu Chek 360 software for downloading. We used data of all insulin users T2D patients that came for physician’s appointment at the diabetes unit in a public hospital, in the city of Sao Paulo, from March to June 2015. A survey regarding the glucometer usage was applied. The results from a total of 417 patients, 95 were eligible to this analysys. It was not possible to use glucometer information in 31.6% of 95 patients because the reasons on figure 1. It was suitable to collect data from 68.4% of 95 patients, nevertheless, 43.1% of these performed less than 90 blood glucose tests (less than once a day) and causes are shown in figure 2.

Conclusion: Insulin users T2D patients receive glucometer and supplies from government for free, however the device information was useful only in 56.9% of all cases. The main reason was lack of information how
to use the device and the second was lack of motivation to keep diabetes treatment. Our results showed that we need more education programs for our patients because giving glucometer without education will not help diabetes treatment.

A202
Chronicity, self care, social and family support: how the patient has?
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A202

Background: Diabetes mellitus is a non-communicable chronic systemic disease. It is estimated that in 2030 will have over 300 million diabetics worldwide. Perform preventive measures on the glycemic control, foot care and other education initiatives in diabetes favors the reduction of signs and symptoms of the disease progression.

Objective: This study aimed to evaluate sociodemographic and clinical characteristics of a group of diabetics as well as meet social relations that permeate the self-care of these patients.

Materials and methods: Cross-sectional study, epidemiological performed in a referral center for diabetes and hypertension the northeast region of Brazil in the period June to August 2013.

Results: A total of 538 people with diabetes, and the study population was predominantly female (63.4%), married people or with fixed partners (55.6%), older (59.7%), Catholic (72.1%), low education, less than 10 yrs. (74%); 65% with incomes below twice the minimum wage. On clinical data 79.2% were hypertensive, 69.1% with over 10 yrs. of diagnosis of diabetes mellitus, 40.7% used medication by mouth for diabetes control, when asked about the help or assistance of others towards treatment, 62.3% reported not having social or family support or even encouragement to move with adherence to medication or non-medication treatment for diabetes. When asked about following the prescribed diet, only 60.4% reported following the diet routinely, as physical activity, 61.2% of persons were sedentary, 72.7% presented themselves with excess weight, and those with overweight or obese, 63.6% of diabetic people found themselves with altered glycemia, with greater 140 mg/dL at the time of data collection at random.

Conclusion: Notoriously we see, when we analyze the data, the chronicity characteristics of the disease, lack of social and family support to these patients, worsening of clinical status and poor adherence to self-care of the person with Diabetes Mellitus. It is extremely important that multidisciplinary actions aimed at intensive care to this population are drawn at national level through effective public health policies they can minimize grievances as well, decrease complications using lines of care in diabetes care and management.
Figure 2(abstract A201) Reasons that less than 90 blood glucose tests were performed

Figure 1(abstract A202) Socio-demographic characteristics of people with diabetes mellitus treated as a referral center in a Northeastern capital. 2015
Diabetes mellitus is associated with poor self-rated health in olders compared to other chronic conditions

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1): A203

Background: Self-rated health is one of the most widely used indicators to estimate health conditions of a population. There is evidence of its reliability and its potential in predicting mortality, and functional decline. However, little is known of which chronic diseases that most affect the self-perception of health of the elderly.

Objectives: To estimate the prevalence of self-rated poor health and their association with chronic conditions in elderly.

Materials and methods: This is a cross-sectional study, with older adults (>60 anos), users of the Unified System of Health. The sample was held in multiple stages, from the Health Districts of Goiânia-GO. Data were collected from December 2008 to March 2009. Self-rated health was dichotomized in self-rated good health (very good/good/fair) and bad (poor/very poor). Chronic diseases were identified through the responses to the question: “Which diseases the doctor has said that you have?” The relationship between self-rated poor health and the chronic conditions were explored through the prevalence ratio (PR). Multivariate analysis was performed using Poisson regression with hierarchical analysis. Were included in this analysis the variables with value p <0.20. The tests were performed in STATA 12.0.

Results: From 403 elderly, 66% were female, 29.8% aged 65-69 and 28.8% with less than 1 year of study. Self-rated poor health was reported by 27.5% of the elderly, with higher prevalence among women (29.7%) and aged 60-64 yrs. (29.1%). Poor self-rated health was associated with: 3 or more morbidities (RP=1.98, 95%CI 1.36-2.90), have diabetes (RP=1.57, 95%CI 1.05-2.34), musculoskeletal diseases (RP=1.64; 95% CI 1.11-2.45), have been hospitalized in the past year (RP=1.68; 95%CI 1.14-2.49) and polypharmacy (RP=1.70; 95%CI 1.07-2.68). In multivariate analysis, the highest PR were diabetes (RP=.52, 95% CI 1.02-2.27) and musculoskeletal diseases (RP=1.84, 95%CI 1.26 to 2.68).

Conclusions: The result shows that Diabetes Mellitus and musculoskeletal diseases are associated with poor self-rated health. Both conditions can lead to functional limitations, disability and require a variety of health care, in particular Diabetes Mellitus. These factors can generate a sense of bad health conditions, and take the elderly mean a bad health. Therefore, this is an indicator that can be evaluated in older people with diabetes, and musculoskeletal diseases either in clinical practice, as in the management of health services.

Figure 2(abstract A202) Clinical date of people with diabetes mellitus treated as a referral center in a Northeastern capital. 2015
A204
Economics of diabetes mellitus: evidence of the disease’s social cost for Brazilian data in 2008
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A204

Background: Diabetes mellitus (DM) is characterized by the high level of blood glucose. Ministry of Health data estimated that Brazil had about 10 million DM cases in 2010, being the fourth main cause of death. World Health Organization estimated the prevalence of DM in Brazil was 10.2% in 2008, about 20 million people.

Objectives: To measure the DM social cost based in earnings losses of Brazilian workers due to disease in 2008 using data from National Survey of Households of the Brazilian Institute of Geography and Statistics (Pnad/IBGE).

Materials and methods: A Binary Probit model was used to measure the participation in work force and a two-stage Heckman model to measure worked h and productivity. Each model is estimated separately for both gender individuals, with and without disease, according three distinct definitions for DM: Restrict, Broad and Comorbidities. To capture the counterfactual effect, the model was calculated for ill and healthy individuals. The difference of both values exhibited the losses, which were aggregate to the whole population and the total cost was estimated.

Results: According each criterion, respectively, DM reduced the participation in the labor market in 0.97%; 4.60% and 7.06% for men and 0.14%, 4.79% and 6.44% for women, while reduced, respectively 1.51%; 6.40% and 9.15% in productivity and 6.44%; 15.23% and 17.28% in worked h just for women. There was no impact of DM on productivity and in worked h for men. The DM total cost was R$ 8.064 billion, or US $3,451 billion converted by current exchange rate. The losses reached 0.73% of total earnings and 0.27% of Brazilian GDP in 2008.

Conclusions: DM generates significant losses in income of Brazilian workers, especially in relation to their participation in the labor market, since affects both of gender. The results indicate that public policies should be directed to disease diagnosis and prevention, since the development of comorbidities amplifies the effect of losses.

GENETICS AND AUTOIMMUNITY
A205
RS2910164 polymorphism in the mircorna-146a is associated with risk for type 1 diabetes mellitus
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A205

Background: Type 1 diabetes mellitus (T1D) is characterized by severe autoimmune destruction of pancreatic beta-cells, which renders subjects insulin-dependent for life. The triggering of autoimmunity against beta-cells is probably caused by a combination of environmental and genetic risk factors. Even though much is known about the genetic of T1D, more information is needed to completely unravel this tangled web. MicroRNAs (miRNAs) are a class of small noncoding RNA molecules that negatively regulate gene expression by inducing target mRNA cleavage or by inhibiting protein translation. Abnormal miRNA expression has been described in several pathological conditions, including autoimmune diseases. MicroRNAs are attractive biomarker candidates as they can be easily collected, are stable under different storage conditions and can be measured using specific assays.

Objective: To investigate circulating candidate miRNAs as potential biomarkers for T1D diagnosis.

Materials and methods: We analyzed 25 T1D patients (13: <5 yrs. of diagnosis, and 12: >5 yrs. of diagnosis) and 20 age- and gender-matched nondiabetic controls. Expressions of 48 miRNAs were investigated in the plasma using Stem-loop RT-PreAmp Real-time PCR and TaqMan Low Density Array cards (Life Technologies). Array data was analyzed using Symphony (Life Technologies) and SPSS 18.0 programs.

Results: Seventy-seven percent (37/48) of the miRNAs analyzed were downregulated (miR-93* and miR-146a) while 84.6% (11/13) miRNAs were upregulated (miR-101, miR-200a, miR-148b, miR-210, miR-155, miR-320, miR-103, miR-145, miR-21*, miR-126, miR-148a) in T1D patients. On the other hand, no differences were detected between controls and T1D patients with >5 yrs. of diagnosis.

Conclusion: Our data demonstrate that some circulating miRNAs are differentially expressed in T1D patients in the first yrs. of the diagnosis. Ongoing studies will further explore the role of these miRNAs as novel biomarkers for T1D prediction.
**Background:** Maternally inherited diabetes and deafness (MIDD) is a rare cause of diabetes (DM) occurring due to mutation in mitochondrial DNA. The A3243G substitution in the tRNA leucine gene is the most common mutation and is found in 0.4% of those with type 2 DM. The suspicion and diagnosis are important given the unique management issues and associated comorbidities of this disease.

**Objective:** Raise the awareness of monogenic diabetes, presenting the features that led to clinical suspicion in a patient with MIDD.

**Materials and methods:** Case report.

**Results:** We report a case of a 44-year-old woman admitted to the Internal Medicine ward with a two-weeks history of signs and symptoms of community-acquired pneumonia and heart failure. She was known to have DM since the third decade of life, hearing loss since the adolescence in addition to hypertension and was in use of metformin, losartan, simvastatin and NPH insulin, with recurrent episodes of hypoglycaemia. Physical examination showed a 23Kg/m² BMI. Muscular weakness and tachycardia was present. Ophthalmological examination was unremarkable. She had a low C peptide (0.34ng/mL) and a glycated hemoglobin of 6.7%. Audiogram revealed bilateral sensorineural hearing loss in high frequencies. Echocardiogram showed an enlarged atrium (42mm), a low ejection fraction (43%) with lateral and inferolateral hypertrophy. Familial history was noteworthy: his son died at 21 because of high undiagnosed hyperglycemia. Three of four brothers also had DM and one additionally had deafness and history of stroke and seizures, raising the suspicion of MELAS syndrome. Blood sample were collected from the kindred for molecular testing and using specific primers to the relevant region of mtDNA bp 3558-3539 and bp 3130-3149 PCR amplification was carried out. The A3243G mutation was identified in blood leukocytes with 70% heteroplasmy in the proband and with variants in the proband and with variable percentage in the family.

**Conclusion:** The diagnosis of mitochondrial diabetes relies on high clinical suspicion to select those who benefits from molecular analysis. Systemic features like hearing loss, cardiomyopathy, myopathy and neurological symptoms associated with a strong familial history must call the attention for the diagnosis. This allows appropriate therapeutic management of hyperglycemia, early detection and treatment of associated disorders in addition to genetic counselling.

*Written informed consent was obtained from the patient for publication of this abstract.*

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**A208**

**Phenotype of regulatory T cells in human type 1 diabetes at diagnosis and partial remission phase**

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**Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A208**

**Background:** Human type 1A diabetes (T1AD) has a broad spectrum of clinical phenotypes which are associated with the severity of autoimmune response and consequently, different levels of pancreatic beta cells destruction. The T1AD presents a partial remission phase. The remission phase is classically a short period in childhood-onset diabetes, but longer periods may occur especially in young.

**Objective:** This study was designed to investigate cellular immunity focusing regulatory T-cells (Tregs) in different disease stages of the disease.

**Materials and methods:** A total of 13 T1AD patients: 8 newly-diagnosed T1AD (age: 7.9±6.3 yrs, insulin dose: 0.5 U/kg/day) within 1.0±0.9 months of their diagnosis, 5 in partial remission, for 1.2±1.0 yrs. after diagnosis (age: 10.8±6.8 yrs., insulin dose: 0.2 U/kg/day) and 9 healthy controls (21.9±2.7yrs.) were studied. Phenotypic analysis of Tregs was performed by flow cytometry on peripheral blood. After a Lys/Wash protocol, cells were stained for CD4, FoxP3, CTLA4, CD25. T cell markers CD25, CTLA-4 and FoxP3 were examined on cells within the CD4 gate. Groups were compared using an one-way ANOVA test.

**Results:** The frequency of circulating CD4⁺CD25⁺ and CD4⁺FoxP3⁺ T cells was significantly reduced in newly-diagnosed T1AD compared to patients in partial remission and controls (1.7±0.6% vs 4.0±2.1% vs 3.3±1.2%, p<0.01 and 0.7±0.7% vs 2.0±2.0% vs 2.3±0.8%, p<0.03 respectively).

**Conclusions:** These preliminary data showed decreased peripheral Tregs frequency in classical childhood-onset T1AD. In contrast, the group of long-term remission patients had similar frequency to controls and some of them presented latent autoimmune diabetes features. Immunophenotyping at the time of diagnosis and during follow-up may help the definition of both T1AD clinical subtypes and remission period.

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**A209**

**Long-term retention of non-functionalized carbon nanotubes in nod mice and its influence on the evolution of autoimmune diabetes**

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**Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A209**

**Background:** The perspectives of using carbon nanotubes (CNTs) in medicine evoked many researches aiming to evaluate their risks on the human health as well as on the environment.

**Objective:** This study focuses the long-term effects of the systemic administration of non-functionalized multi-walled carbon nanotubes (MWCTNs) on the evolution of spontaneous autoimmune diabetes in Non-Obese Diabetic (NOD) mice.

**Materials and methods:** The protocol consisted in treating 6 weeks old NOD/Uni mice with a single intra-peritoneal dose of MWCTN (100 µg/animal) or the vehicle Pluronix (control group). Mice were followed during 24 weeks.

**Results:** Histological data confirmed that the non-functionalized MWCTN had been absorbed and kept retained into the phagocytes of the peri-pancreatic lymph nodes, spleen and liver, causing a granulomatous inflammatory response. Even though no differences were found in the frequency of the development of clinical diabetes or in the morphological characteristics of the pancreatic insulitis, female NOD mice treated with MWCTN presented a significant higher fluctuation of the average glycaemia compared to the control group during the entire study (p<0.0001; Wilcoxon), with a tendency to an abbreviation of clinical diabetes onset. Analyses of the pro-inflammatory and the anti-inflammatory responses in the peri-pancreatic lymph nodes revealed the induction of a Th1 response in the treated animals, between 8 and 14 after MWCTN exposition, with an increase of the expression of IFNγ and a reduced expression of TGFβ. This profile remained until the end of the study, 24 weeks after MWCTN injection.

**Conclusion:** These data show that MWCTN may be retained for at least 6 months in lymph nodes and pancreatic ducts of NOD mice. Therefore, despite the evident need of modifying nanotubes, it is important to consider the high risks of exposing these molecules to humans, since chronic inflammation may be related to the development and/or the aggravation of autoimmune diseases.

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**A210**

**Association between type 1 diabetes mellitus and epilepsy: more than coincidence?**

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**Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A210**

**Background:** Maternally inherited diabetes and deafness (MIDD) is a rare cause of diabetes (DM) occurring due to mutation in mitochondrial DNA. The A3243G substitution in the tRNA leucine gene is the most common mutation and is found in 0.4% of those with type 2 DM. The suspicion and diagnosis are important given the unique management issues and associated comorbidities of this disease.

**Objective:** Raise the awareness of monogenic diabetes, presenting the features that led to clinical suspicion in a patient with MIDD.

**Materials and methods:** Case report.

**Results:** We report a case of a 44-year-old woman admitted to the Internal Medicine ward with a two-weeks history of signs and symptoms of community-acquired pneumonia and heart failure. She was known to have DM since the third decade of life, hearing loss since the adolescence in addition to hypertension and was in use of metformin, losartan, simvastatin and NPH insulin, with recurrent episodes of hypoglycaemia. Physical examination showed a 23Kg/m² BMI. Muscular weakness and tachycardia was present. Ophthalmological examination was unremarkable. She had a low C peptide (0.34ng/mL) and a glycated hemoglobin of 6.7%. Audiogram revealed bilateral sensorineural hearing loss in high frequencies. Echocardiogram showed an enlarged atrium (42mm), a low ejection fraction (43%) with lateral and inferolateral hypertrophy. Familial history was noteworthy: his son died at 21 because of high undiagnosed hyperglycemia. Three of four brothers also had DM and one additionally had deafness and history of stroke and seizures, raising the suspicion of MELAS syndrome. Blood sample were collected from the kindred for molecular testing and using specific primers to the relevant region of mtDNA bp 3558-3539 and bp 3130-3149 PCR amplification was carried out. The A3243G mutation was identified in blood leukocytes with 70% heteroplasmy in the proband and with variants in the proband and with variable percentage in the family.

**Conclusion:** The diagnosis of mitochondrial diabetes relies on high clinical suspicion to select those who benefits from molecular analysis. Systemic features like hearing loss, cardiomyopathy, myopathy and neurological symptoms associated with a strong familial history must call the attention for the diagnosis. This allows appropriate therapeutic management of hyperglycemia, early detection and treatment of associated disorders in addition to genetic counselling.

*Written informed consent was obtained from the patient for publication of this abstract.*
Background: Type 1 diabetes mellitus (T1D) patients have an increased risk of seizures at extremes of glycemic control. There is growing evidence about the role of autoimmunity in the epileptogenesis and glutamic acid decarboxylase antibodies (GAD-ab), a well-known antibody related to neurologic diseases, can be a link that justifies epilepsy in T1D population. GAD catalyzes the conversion of glutamic acid, the main excitatory central nervous system (CNS) amino acid, into gammalaminobutyric acid (GABA), the main inhibitory CNS neurotransmitter. GABA-secreting neurons and pancreatic beta cells are the major cells expressing GAD. Seizures may be result of imbalance between excitation and inhibition determined by inhibition of GAD activity caused by autoantibodies. The potential pathogenic role of GAD-ab in neurological disorders is not fully understood, but inhibition of GABA synthesis or interfering with the exocytosis are plausible hypotheses. The spectrum of neurological disorders associated with GAD-ab includes cerebellar ataxia, myoclonus palatal, limbic encephalitis, encephalomyelitis, stiff person syndrome and others.

Objectives: Assess the prevalence of epilepsy in T1D population.

Materials and methods: Cross-sectional study in which data were collected on all T1D patients who had attended the Type 1 Diabetes Clinic. Epilepsy was diagnosed when two or more unprovoked euglycemic seizure had been reliably documented.

Results: Data were analyzed for 375 T1D patients (165 males and 210 females, mean age 28.0±10.9 yrs., range 11-66 yrs.), of these 17 had a confirmed diagnosis of epilepsy (9 males and 8 females, mean age 27.1±6.9 range 17-38 yrs.). The frequency of epilepsy in this T1D population is 4.5%. Conclusion: We found an increased frequency of epilepsy in T1D. The prevalence of epilepsy in general population is between 0.5-1%, but in observed T1D population the frequency of epilepsy is 4.5%, which is 4.5-9 times higher. The reason of this association is not completely understood, but metabolic alterations and autoimmunity can play a role. In the last few yrs., there has been increasing interest in the potential role of GAD-ab in the pathogenesis of several neurologic diseases, including epilepsy. Epilepsy and T1D are serious worldwide problems with potential morbidity and social management costs. This possible association may result in different therapeutic strategies based on its possible autoimmune process.

A211

Alpha-linolenic acid supplementation effect in endoplasmic reticulum stress and adiponectin in abdominal subcutaneous adipose tissue in patients with type 2 diabetes mellitus

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A211

Background: In recent decades, it has seen a pandemic of type 2 Diabetes Mellitus (T2D) with high morbidity and mortality. T2D is associated with reduced levels of adiponectin and activation of endoplasmic reticulum stress (ERS), signals of chronic inflammation. In this context, it is necessary the study of new possibilities to improving this inflammation and there are many studies showing the anti-inflammatory effect of n-3 polsunsaturated fatty acid (PUFA).

Objectives: In this study we aimed to evaluate the effect of alpha-linolenic acid (ALA), a type of PUFA, supplementation in T2D patients on the molecular expression of adiponectin and ERS genes in abdominal subcutaneous adipose tissue (SAT).

Materials and methods: We performed a placebo-controlled study, in a double-blind design with 20 patients with T2D, they received randomly 3g/day of ALA or placebo for 60 days and the SAT was collected by fine-needle aspiration before and after the supplementation. We evaluated the molecular expression of genes of adiponectin and ERS genes by real-time PCR and western blotting.

Results: We observed the genic expression of adiponectin was increased after supplementation of ALA almost 90%, however we did not observe change of protein concentration by western blotting. In the ERS genes, we observed the reduction of the genic expression in XBP1 (20%), CHOP1 (70%) and increase in GRP78 (150%) and confirmed in protein concentration in the SAT. Furthermore we observed reduction in genic expression in IL-6 (80%) and IRS-1 (6-9%), but it did not observed in protein concentration.

Conclusion: Therefore ALA may modulate the ERS by the pathway of IRE1/XBP1 leading to increase the chaperones (BIP/GRP78), beside may modulate the adiponectin genic expression, but without change in protein concentration in SAT.

A212

Clinical and molecular update of a large cohort followed by the Brazilian MODY multicenter study group (BRASMODY)

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A212

Background: Maturity-Onset Diabetes of the Young (MODY) is a group of monogenic forms of diabetes mellitus (DM) caused by mutations in at least 13 genes. Mutations in Glucokinase (GCK) and Hepatocyte nuclear factor-1 homebox A (HNF1A) are the most common. Frequency of subtypes varies according to studied population. A broader view of MODY in Brazil is needed to improve diagnosis, epidemiological registry, and clinical care, also paving the way for future research.

Objective: To update HNF1A and GCK mutations found in Brazilian patients with MODY phenotype, comparing its clinical characteristics to patients with a MODY phenotype but no mutations.

Materials and methods: Literature review of published MODY mutations in Brazilian individuals was conducted. Unpublished clinical data of patients with MODY phenotype (both with/without mutations) were obtained directly from BRASMODY authors.

Results: 285 Brazilian patients (119 families) have been enrolled. Twelve mutations in HNF1A and 21 in GCK were described in 92 individuals (Figure 1). 7 GCK mutations being first described in Brazilian subjects. Classical MODY criteria (early-onset familial DM) yielded low rates of GCK diagnosis (8.7%), whereas more specific criteria (non-progressive mild hyperglycemia) yielded close to 100% of diagnosis in recent studies. Classical criteria detected HNF1A mutations in only 20.2% of individuals. Comparing individuals with no mutations, GCK, and HNF1A, differences were seen in sulfonylurea use (31.8 vs. 7.3 vs. 58.3%, p<0.001), insulin use (45.3 vs. 4.9 vs. 16.7%, p<0.001), hypertension (29.3 vs. 5.3 vs. 23.8%, p<0.009, all ≥2, 2 df), and median C-peptide (1.11 vs. 1.60 vs. 0.93 ng/dL, p=0.049, Kruskal-Wallis), GCK patients had lower age at diagnosis (17.9±13.9 vs. 26.7±13.0 yrs., p<0.001), body mass index at diagnosis (19.2±4.5 vs. 24.7±3.7 kg/m2, p=0.006), and HbA1c (6.32±0.54 vs. 7.77±2.66, p=0.008, all ANOVA/Tukey) than individuals without mutations. No phenotype/genotype correlation was observed in both GCK and HNF1A groups.

Conclusions: MODY mutations in Brazilian individuals show clinical distinction among different subtypes of monogenic DM, mainly between GCK and other MODY types. Mild non-progressive hyperglycemia was an adequate screening tool for GCK mutations. Given the low positivity rate of HNF1A mutations, new recruitment strategies are needed. Although rare, other monogenic forms of DM types should be investigated in this subgroup of patients without GCK/HNF1A mutations.

A213

MODY screening: a new center for molecular genetic diagnosis in Brazil

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A213

Background: Maturity-Onset Diabetes of the Young (MODY) is a form of monogenic diabetes characterized by autosomal dominant inheritance, young age of onset and pancreatic beta-cell dysfunction without autoimmune cause. To date 13 genes have been identified associated with MODY phenotype, with four of them (HNF1A; GCK; HNF4A and HNF1B)
being responsible for over 95% of cases. Recently, our group has initiated molecular genetic screening for MODY using Sanger’s sequencing method.

**Objective:** To report novel mutations related to MODY 2 (GCK) and 3 (HNF1A) of a large cohort of Brazilian diabetic families in a new MODY diagnostic center.

**Materials and methods:** A total of 126 subjects from 63 Brazilian families were screened for GCK or HNF1A mutations: 30 families with clinical suspicion of MODY 2 and 33 families with MODY 3 phenotype. All exons and adjacent intronic regions of GCK and HNF1A genes were studied.

**Results:** We found 16 GCK mutations (11 nonsynonymous, 2 splice site and 3 frameshift-deletion) in 30 families (53%). Five of these variants were novel: c.580-3C>A (IVS5); c.505A>G/p.K169E; c.110T>C/p.M37T; c.326_326delC/p.I110fs*6 and c.1247_1247delA/p.H416Pfs*15. HNF1A mutations were found in 6 families (18%): 2 nonsynonymous, 1 nonsense and 3 frameshift-insertion. One was a novel mutation: c.1558C>T/p.Q520*.

All 6 novel variants were absent in databases of healthy controls (1KG/ESP-6500) and were predicted to be damaging using in silico analysis (Polyphen-2, MutationTaster, SIFT/PROVEAN, Human Splicing Finder). In variants p.K169E and p.M37T, the substitution occurred in a codon already associated with MODY. All 6 subjects with novel variants have diabetes onset before age of 25 and BMI below 25. Five of them have family history of diabetes and one have parents without impaired fasting glucose. Familial co-segregation analysis was possible in 3 of the 6 probands, in which the variant segregated in family members with diabetes. All of them had detectable fasting C-peptide (range 0.7-2.3 ng/mL) 3 yrs. after diagnosis of diabetes, and negative beta cell pancreatic antibodies (GAD, IA2, IAA).

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**Figure 1 (abstract A212)** List of MODY mutations present in Brazilian individuals (novel mutations in bold type)
Conclusion: This molecular study has identified 6 unpublished mutations in subjects with clinical features of MODY, expanding the number of variants associated to this phenotype.

A214

Relationship of polymorphisms in microRNAs -124 e -126 with diabetic retinopathy in patients with type 2 diabetes

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A214

Background: MicroRNAs (miRs) are small non-coding molecules that regulate gene expression post-transcriptionally by promoting translational repression or degradation of target mRNAs. Altered expression as well as mutations in the sequences of miRs or their target sites have been related to a great number of diseases, including diabetes and its complications. The G allele of the rs331564 (C>G) polymorphism in miR-124 gene was already associated with increased risk of type 2 diabetes mellitus (T2D) and the A allele of the rs4636297 (G>A) polymorphism of miR-126 gene was associated with severity of diabetic retinopathy (DR).

Objective: To investigate the association of rs531564 (C>G) polymorphism of miR-124 gene and rs4636297 (G>A) polymorphism of miR-126 gene with the presence and severity of DR in patients with T2D.

Materials and methods: The sample comprises 627 T2D patients, including 248 subjects without DR, 223 with nonproliferative DR and 156 with proliferative DR. In addition, a population sample of 139 healthy blood donors was also analyzed. Patients were enrolled at four public hospitals in the State of Rio Grande do Sul and blood donors were recruited at one public hemotherapy center. Genotyping for both polymorphisms was done by real-time polymerase chain reaction method. Results: Genotype frequencies were in agreement with those expected by the Hardy-Weinberg equilibrium. Genotype and allele frequencies of rs331564 (C>G) polymorphism of miR-124 gene and rs4636297 (G>A) polymorphism of miR-126 gene with the presence and severity of DR were in Hardy-Weinberg equilibrium. The high-risk DR4-DQ8 type was 66.7% in T1D cases and 15.3% in controls (OR=11.059, 95%CI 6.68-18.29; P <0.0001). The high-risk DR3/4-DQ8 heterozygous haplotype was observed in only one T1D patient and in none control subject.

Conclusion: As expected, the high-risk HLA-DR4-DQ8 haplotype is associated with increased risk for T1D in our population. The genetic risk of non-HLA genes on T1D in Southern Brazil can now be corrected for different high-risk HLA-DR/DQ types.


A216

Polymorphisms and genetic susceptibility of type 1 diabetes mellitus and celiac disease

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A216

Background: Type 1 diabetes mellitus (T1D) is a chronic autoimmune disease characterized by pancreatic beta-cell destruction, hyperglycemia and progressive insulin deficiency, affecting mainly children and adolescents genetically predisposed. About 10% (2.4-16.4%) of T1D individuals develop celiac disease (CD), an immune-mediated enteropathy triggered by gluten exposure. Both diseases have a common autoimmune origin and share a similar genetic Background, the major histocompatibility complex class II antigen (HLA-DR, DQ). Some genetic association studies have also identified susceptibility polymorphisms non-HLA associated to both diseases, located in different genes: RGS1 (rs2816316), IL2-IL21 (rs6822844), BACH2 (rs17755527) and IL18RAP (rs917997).

Objective: The aim of the present study was to determine the allelic and genotypic frequencies of polymorphisms in RGS1, IL2-IL21, BACH2 and IL18RAP genes in a sample of 317 T1D individuals and to compare the frequency of the risk alleles in patients with negative (N=264) or positive (N=53) serology for CD.

Materials and methods: Saliva or blood sample was collected and DNA extraction and genotyping performed by PCR Real-Time. All polymorphisms were in Hardy-Weinberg equilibrium. The comparison between the allele and genotype frequencies was calculated by Chi-square and Fisher’s exact test.

Results: The frequency of the risk allele for the genes RGS1 (allele A); IL2-IL21 (allele C); BACH2 (allele C) and IL18RAP (allele T) in T1D individuals and negative serology for CD was respectively: 95.5%, 97.4%, 79.8% and 46.6%. In T1D with seropositive, the frequency of the same alleles were: 98.1% (p=0.703), 100.0% (p=0.604), 86.0% (p=0.433) and 46.2%(p=1.000). Both genotype and allele frequencies were not significantly different between T1D with negative or positive serology for CD.

Page 100 of 124
Conclusion: Our data did not evidence differences between the polymorphisms non-HLA analyzed in T1D with or without seropositive for CD, being not possible to assure that the presence of these polymorphism increase or decrease the predisposition to celiac disease.

A219
Association of interleukin 21 receptor gene variants with autoimmune diseases in a type 1 diabetes cohort
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A219

Background: Type 1 Diabetes (T1D) is an autoimmune disorder mediated by T lymphocytes and dendritic cells. The lymphocyte activation involves the inflammatory pathways T helper1 (Th1), Th2 and Th17 and the inhibition of regulatory T cells. It was found that Th17 pathway is implicated in the inflammatory process termed insulitis, resulting in the destruction of pancreatic beta cells, being regulated by the interleukins IL-21, IL-23 and IL-27. Studies have demonstrated a role for the interation of IL21 and its receptor IL21R in the genesis and progression of many autoimmune diseases. The variant rs2214537 was associated with multiple sclerosis and Kawasaki disease and rs2285452 with thyroid disease.

Objective: The aim of this study was to evaluate the influence of the variants rs2214537 and rs2285452 of the gene of IL21R (cr. 16p11) in susceptibility to T1D and the frequency of pancreatic and extra-pancreatic autoantibodies in patients with T1D in Sao Paulo.

Materials and methods: We evaluated 631 patients with T1D (25±12.7) and 652 controls (26.6±11.4). The variants rs2214537 and rs2285452 were genotyped by the Vera Code Golden Gate (Ilumina) methodology. Autoantibodies against zinc transporter 8 (anti-ZnT8) were determined by ELISA and anti-glutamic acid decarboxylase (anti-GAD65), anti-tyrosine phosphatase (anti-IA2), anti-thyroid peroxidase (anti-TPO), and anti-tireoglobulin (anti-Tg) autoantibodies were measured by radioimmunoassay. Anticnuclear (FAN) and anti-parietal cell (PCA) antibodies were measured by indirect immunofluorescence; rheumatoid factor by nephelometry and anti-TSH receptor antibodies (TRAb) by radioreceptor assay. The genotypic associations were analyzed using the Chi-square test or Fisher exact test.

Results: The genotype frequencies of rs2214537 and rs2285452 variants were in Hardy-Weinberg Equilibrium, similar in patients and controls and independent of gender. However, the CC genotype of the rs2214537 was associated with higher frequency of PCA (16.7% x 4.8%; p=0.0016, OR=3.93; CI=1.6-9.7). The AA genotype of rs2285452 increased the frequency of the anti-TPO (48.4% x 27.3%; p=0.01; OR=2.49; CI=1.19 to 5.24) and PCA (19.2 x 7.5%; p=0.04; OR=2.95; CI=0.99 to 8.75) p<0.05. There was no influence of these variants on the frequency of the other autoantibodies analyzed.

Conclusions: The CC genotype of the variant rs2214537 and the AA genotype of the rs2285452 were related to higher frequency of extra-pancreatic autoantibodies confirming their role in autoimmune in T1D patients.

A220
Identification of single base mutations in the GCK gene of patients with diagnosis of MODY2
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A220

Background: Diabetes mellitus (DM) refers to a group of common metabolic disorders, with multiple causes, that share a common phenotype: hyperglycemia (Kota, 2012). The concept of multiple etiologies is recent and a third group of DM is proposed today, a monogenic form with autosomal dominant inheritance: MODY. There are 13 subtypes described for MODY, which in MODY2 is one of the most common, although the relative frequency varies according to the study population (Corrales et al., 2010). MODY2 is provoked by mutations in the glucokinase gene (GCK) located on human chromosome 7p15.3-p15.1, which consists of 10 exons that span 45.169 bp and encode a 465-amino-acid protein (Tinto et al., 2008).

Objective: To identify single base mutations in the GCK gene of patients with diagnosis of MODY2 and evaluate whether these mutations are related to the disease.

Materials and methods: This study was approved by Ethics Committee under no 923744. Patients who provided blood samples signed informed consent. DNA was extracted with Genomic DNA mini kit (Invitrogen). Primers for amplification of exon 10 are described in the literature (Boutin et al., 2001) and PCR was performed with GoTag kit (Promega). The amplicons were sequenced with BigDye Terminator v.3.1 kit (Life Technologies). Sequences obtained were analyzed by SeqManTM II program (DNA Star Inc.). Comparisons of the files were held with the bank sequences of the human genome plus the bank transcripts (NCBI) using BLAST program (Altschul et al., 1997).

Results: The case study was conducted with a female proband, 40 yrs., with MODY2 diagnosis. Santos et al (2014) identified 3 mutations in the upstream promoter GCK gene for this proband and hypothesized if mutations in the promoter could be responsible for the disease. To test this hypothesis, we started sequencing all exons to include the possibility if other mutations are responsible for the phenotype. So far, we haven’t found SNPs in sequenced exons (A, B and C) and from 2 to 6. Few studies have reported mutations in GCK promoter, but these can be connected with some form of diabetes, such as gestational diabetes (Santos et al 2014).

Conclusions: In this study, we sequenced 70% of the exons of the GCK gene and SNPs were not identified or any other type of mutation that corroborate the hypothesis of MODY2. However, these Results added to the previous GCK promoter data of this proband strengthens the hypothesis that the reported mutations interfere with the ideal regulation of gene expression.
In this study we reported one new mutation within the MODY disease, however, it is thought that mutation within splicing site may be implicated in roughly 10% of the total disease caused by mutations (Ward and Cooper, 2010).

**Conclusion:** In this study we reported one new mutation within the splicing site, downstream to the exon 6 of the GCK gene. In the future perspectives we will investigate whether this mutation is or is not related to the MODY2 disease.

### A222

**Haplotypic analysis of DQ2.5 and DQ8 by simple nucleotide polymorphism technique (TAG-SNP) in type 1 diabetes and/or celiac disease patients**

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**Background:** Celiac disease (CD) is a chronic and permanent enteropathy triggered by ingestion of gluten proteins, present in wheat, rye and barley, in genetically predisposed individuals, as type 1 diabetes mellitus (T1D) patients, who have a higher prevalence of the disease compared to the general population. Both diseases have similar autoimmune origin, being associated to the histocompatibility complex class II antigen (HLA), mainly DQ2.5 and/or DQ8 haplotypes, allowing estimating negative predictive value accurately. Nevertheless, these genetic tests are expensive, making its implementation a challenge in routine clinical practice.

**Objective:** The aim of the study was the evaluation of the frequency of DQ2.5 and DQ8 haplotypes in T1D and CD patients, using a simple nucleotide polymorphism technique (Tag-SNP).

**Materials and methods:** The study enrolled 365 individuals, being 296 with T1D (without CD=265 and with CD=31) and 69 with only CD. The HLA-DQA1* 0501 and DQB1* 0201 alleles of DQ2.5 and HLA-DQB1*0302 allele of DQ8 were analyzed by HLA Tag SNP and its frequency compared between T1D and CD.

**Results:** The presence of DQ2.5 alleles was found in 57.1% (169/296) among T1D, being significantly more frequent among T1D patients with CD (without CD 54.3% and with CD 80.6%, p=0.006). There was no significant difference in the comparison among T1D with CD and CD individuals without diabetes (80.6% and 62.3%, p=0.054). The presence of the DQ8 allele was found 54.2% (160/295) among all T1D (without CD 51.6% and with CD 48.4%,p=0.569).The DQ8 allele was significantly higher among T1D with CD when compared to CD individuals without diabetes (72.6% and 29.5%,p<0.001).

**Conclusion:** Our data evidenced a higher frequency of HLA-DQA1* 0501 and DQB1* 0201 alleles of DQ8 in T1D than CD patients without diabetes, which did not exclude CD in this group of patients. However, the analysis of HLA-DQA1* 0501 and DQB1* 0201 alleles of DQ8 is useful in the evaluation of the risk of CD in predisposed individuals as T1D patients.

### A223

**Effects of the polymorphisms rs17782313 in mc4r gene and rs2282679 in vdbp gene on the TG-HDL ratio and HOMA-IR through pregnancy**

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Diabetology & Metabolic Syndrome 2015, 7( Suppl 1):A223

**Background:** Maternal adaptations during pregnancy are needed to support the adequate growth and development of the fetus, delivery and lactation. They generate an insulin resistance status and altered lipid metabolism, which can evolve into an imbalance that may precede diabetes and cardiovascular diseases. These patterns of alterations are a result of different interaction amongst genes and environmental factors.

**Objective:** To evaluate the effects of polymorphisms rs17782313 in mc4r gene and rs2282679 in vdbp gene on the TG-HDL ratio and HOMA-IR through pregnancy.

**Materials and methods:** 146 pregnant women from a prospective cohort study conducted at a prenatal unit in Rio de Janeiro, Brazil, from November 2009 to July 2012 were evaluated. Eligibility criteria were: ≥13 gestational weeks, between 20th to 40th yrs. old and no infectious or chronic diseases (except obesity). Women were followed-up in the gestational weeks: 5-13th, 20-26th and 30-36th. Gestational diabetes diagnosis was self-reported. Triglycerides (TG), HDL-cholesterol (HDL), insulin and glucose levels were measured from blood samples collected after 12-hour fasting. HOMA-IR and TG-HDL ratio were calculated. DNA was extracted from blood samples by phenol-chloroform method. Participents were genotyped for the polymorphisms rs17782313 in melanocortin 4 receptor (mc4r) gene and rs2282679 in vitamin D binding protein (vdbp) gene by Real Time PCR method. They were analyzed as carriers CC/CT (homocygotes CC and heterocygotes CT for the rs17782313) and GG/GT (homocygotes GG and heterocygotes GT for the rs2282679) against non-carriers. We evaluated differences for variables between groups by using the Mann-Whitney test.

**Results:** Mean (sd) maternal age (yrs.) was 27.0 (5.5) and there were 12% (17/146) women with BMI ≥30 kg/m2 at early pregnancy and 7% with self-reported gestational diabetes. Frequencies of carriers CC/CT and GG/GT were 34.5% and 33.6%, respectively. Women with CC/CT showed significant difference of TG-HDL ratio against non-carriers at early pregnancy (p=0.02). For the 20-26th and 30-36th gestational weeks, carriers GG/GT had significant differences of TG-HDL ratio when compared to non-carriers (p <0.05). For HOMA-IR, differences were not found for both polymorphisms in any pregnancy period.

**Conclusion:** The vdbp polymorphism seems to be more related to the lipid metabolism than the insulin resistance, perhaps it can be mediated by the interaction between dietary intake and polymorphism.
consumed decaffeinated coffee, caffeinated coffee (with and without sugar), and controls — water (with and without sugar) followed 1 hour by an oral glucose tolerance test (75 g of available carbohydrate) with intravenous labeled dosing interpreted by the two compartment minimal model (225 min). One-way ANOVA with Bonferroni adjustment were used to compare the effects of the tested beverages on glucose metabolism parameters.

**Results:** Decaffeinated coffee resulted in 29% and 85% higher insulin sensitivity compared with caffeinated coffee and water, respectively, and the caffeinated coffee showed 15% and 60% higher glucose effectiveness compared with decaffeinated coffee and water, respectively. However, these differences were not significant (p >0.10). In overall analyze (0 – 225 min) there were no significant differences on glucose effectiveness, insulin sensitivity, and glucose and insulin area under the curve between the groups. The beneficial effects of coffee did not seem to act in the short-term (h) on glucose metabolism parameters mainly on insulin sensitivity indices. The benefits of coffee consumption occur in the long-term (yrs.) as has been shown in the reduction of Type 2 Diabetes Mellitus risk in epidemiological studies. The clinical relevance of the present findings is that there is no need to avoid coffee as the drink choice for healthy people.

**Conclusions:** The findings of this study demonstrate that the consumption of caffeinated and decaffeinated coffee with or without sugar has no acute effects on glucose metabolism in healthy men. Further researches, including long-term interventional studies, are needed to fully elucidate the mechanisms behind the coffee effects on reduced risk for Type 2 diabetes mellitus.

**A225**

**Dietary glycemic assessment and type of lens opacity in patients with age-related cataract**

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A225

**Objective:** To investigate dietary carbohydrate intake, glycemic index and glycemic load and type of lens opacity in patients with age-related cataract.

**Materials and methods:** This was an exploratory cross-sectional study, carried out at the Outpatient Clinics of Nutrition and Ophthalmology at the Federal University of Bahia, Salvador-Bahia, Brazil. Seventy eight patients, of both genders, with age-related cataract, participated. All patients underwent nutritional, clinical and ophthalmological assessment. Type of lens opacity was determined following Lens Opacity Classification System – LOCS III – criteria. Clinical data regarding fasting glucose, diabetes diagnosis and hypertension were collected from medical records. Participants answered two 24h-dietary recall. Global dietary carbohydrate intake (CHO), glycemic index (GI) and glycemic load (GL) were estimated.

**Results:** Most patients had adequate intake of CHO (83.3%), although presenting moderate dietary GI and high dietary GL (62.3% and 52.6%, respectively). No differences were observed in the distribution of these features in relation to the types of lens opacity (p> 0.05). The presence of posterior subcapsular cataract type (PSC) was higher among patients with hyperglycemia (p=0.009) and diabetes (p=0.031).

**Conclusion:** Considering the high prevalence of PSC cataract among those with abnormal blood glucose, nutritional attention should be paid to the quality of dietary carbohydrates in this population.

**A226**

**Physical activity level in elderly assisted in an outpatient of comprehensive health care**

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A226

**Background:** Old age brings many changes and deleterious effects with advancing age, to minimize these declines regular physical activity has a positive effect on prevention and promotion of health of the elderly.
Objective: To identify physical activity level in elderly assisted in an outpatient of comprehensive health care.

Materials and methods: Cross-sectional study with 42 elderly treated at a clinic from a private university in São Luís-MA, conducted between the months from March to May 2015. We collected data on sociodemographic, economic, clinical and nutritional characteristics, anthropometric measurements and physical activity through the IPAQ (International Physical Activity Questionnaire). It was used the procedures of descriptive statistics and measures of association where the level of significance adopted was $p < 0.05$. Data were analyzed using program Stata 12.0.

Results: The distribution between age groups showed a higher proportion of elderly between 60 and 69 yrs. (54.76%), 78.57% had only elementary education, married (57.14%), retired (52.38%) and received up to 3 minimum wages (76.16%). Regarding physical activity, 80.95% were

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**Figure 2 (abstract A225)** Hyperglycemia and diabetes diagnoses by type of lens opacity in 78 patients with age-related cataract

**Figure 3 (abstract A225)** Dietary glycemic assessment of 78 patients with age-related cataract

**Figure 4 (abstract A225)** Glycemic Index, glycemic load and total carbohydrate intake among different types of lens opacity in 78 patients with age-related cataract
inactive, being more pronounced with increasing age (42.86%), associated with this, overweight diagnosis (13.8%), affected by hypertension (22.7%), large medication use (47.62%) and risk for cardiovascular diseases (23.5%).

Conclusion: The findings of the study suggest the need for intervention and encouraging physical activity associated with healthy living habits, considering besides the health aspects of older, the reality of this population.

A227
The in vitro effect of guaraná (Paullinia cupana) extract on human peripheral blood mononuclear cells exposed to a high glucose level
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Background: Nowadays, Type 2 Diabetes Mellitus (T2D) affects a significant percentage of the world population. Due to the high levels of glucose, it causes several damages to the cells and, consequently, to the organism. Plants, such as guaraná (Paullinia cupana), which present bioactive compounds, could help somehow in the treatment of diabetes and other chronic diseases. Studies have shown that guaraná extract, rich in compounds like methylxanthines, theobromine and theophylline, presents many beneficial effects to the organism, such as antioxidant capacity, modulation of nitric oxide intracellular levels, as well as anti-obesity and anti-inflammatory capacity.

Objective: The aim of this study was to evaluate the in vitro effect of guaraná (Paullinia cupana) extract on the viability and cellular proliferation of Peripheral Blood Mononuclear Cells (PBMC) exposed to a high glucose level.

Materials and methods: Guaraná powder was provided by EMBRAPA, located in the city of Maués, Amazonas. The hydroalcoholic extract was prepared following Bittencourt et al. (2013). Initially, peripheral blood from 20 young and healthy individuals (8 h of fasting) was collected. The PBMC were isolated with Ficoll-Histopaque®, cultured in RPMI 1640 medium for 72 h at 37°C and treated with the guaraná concentrations (1 mg/mL, 5 mg/mL and 10 mg/mL), glucose (15 mg/mL) or both. The control group does not receive any treatment. MTT assay was performed to evaluate the cellular proliferation and PicoGreen assay for the evaluation of the cellular viability.

Results: Guaraná increased the cellular proliferation in 50% at the 10mg/mL concentration, for both cells, treated and untreated with glucose (Fig. 1). Guaraná presented a cytoprotective effect on the cellular viability at all tested concentrations, including the cells treated with glucose (Fig. 2). Conclusion: The results indicate that the guaraná (P. cupana) extract has a beneficial effect on the PBMC, increasing the cellular proliferation and decreasing the extracellular dsDNA levels. These data corroborate with other studies that have shown the guaraná antioxidant capacity. The guaraná extract presented statistically significant positive activity even when combined with a high level of glucose, indicating that it could be used to improve the organism functioning of healthy people as well as patients with T2D.

Figure 1(abstract A226) Socioeconomic, demographic and behavioral characteristics of elderly assistant in an outpatient of comprehensive health care. Sao Luis, 2015

Figure 2(abstract A226) Clinical feature characteristics of elderly assisted in an outpatient of comprehensive health care. Sao Luis – Ma, 2015

A228
Comparison of capillary glycemic responses after moderated continuous racing and high-intensity interval training in diabetes type 1 patients
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Diabetology & Metabolic Syndrome 2015, Volume 7 Suppl 1
http://www.dmsjournal.com/supplements/7/S1
**Figure 3 (abstract A226)** Classification of elderly as the practice of physical activity according to the IPAQ in Sao Luis Ma, 2015.

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Association between physical activity level according to demographic variables, behavioral and clinical - nutritional. Sao Luis Ma, 2015.

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**Figure 1 (abstract A227)** Effect of the treatment of guaraná extract and glucose at different concentrations (mg/mL) on the cellular proliferation of PBMC
Variations of glucose levels in patients with diabetes type 1 (DM1) in response to different types of exercise protocols are still unclear. This knowledge would permit a more accurate exercise prescription to these specific subjects and augment the security of its performing.

Objective: The aim of this study was to compare the glycemic response of DM1 subjects after moderate-intensity continuous running protocol (MI) and high-intensity Interval training (HIIT).

Materials and methods: Seven men with DM1, aged 26±6.63 yrs., BMI 24±1.99 kg/m2, with DM1 duration of 15±9 yrs., HbA1c 7.76±0.4%, and physically active without historical chronic complications volunteered to this study. In the MI protocol, subjects remained at a constant rate for 30 min to maximum 60% of the estimated heart rate. In the HIIT protocol, individuals ran for 1 min at high intensity (higher than 90% HR) and walked 1 min 5 km/h for 20 min. Samples were collected in two different days, with an interval of 48 h between them. The first day was composed of physical assessment, dietary investigation of the last 24 h and realization of the first protocol exercise. The second day also consisted of food recall for the last 24 h and realization of the second protocol exercise. The protocols were assigned randomly. During exercise protocols, perceived exertion (PSE), heart rate (HR), blood pressure (BP) and capillary glucose levels were collected immediately before and after and 30 min after the test.

Results: Both performed protocols resulted in blood glucose level decrease in volunteers. However, HIIT promoted a significantly smaller decrease compared to MI (Figure 1) immediately (p=0.01) and 30 min (p=0.02) after exercise.

Conclusion: Both exercise protocols induced glucose reduction in peripheral blood. However, the decline in blood glucose was significantly lower in the HIIT protocol when compared to the MI in DM1.

Background: Changes in the levels of inflammatory cytokines such as tumor necrosis factor (TNF-α) and adiponectin may contribute to the aggravation of inflammatory processes the incidence increasing in 55% of cardiovascular events in diabetic patients. Exercise is indicated as part of diabetes treatment. According to the American Diabetes Association, various kinds of methods should compose a physical training program for diabetics, but the most used protocols are the aerobic and resistance, with few protocols that use the method of combined training.

Objective: To identify which training method is more effective in relation to levels of proinflammatory cytokines and anti – inflammatory type 2 diabetics.

Materials and methods: Study experimental nond randomized was approved by the Ethics Committee in Research of the Hospital Complex HUOC-PROCAPE/UPE on CAAE: 0154.0.106.000.11. 30 individuals with T2D were recruited who are part of the Sweet Life program Supervised Exercise Program for Diabetics the ESEF/UPE. The subjects were divided into 3 groups: Aerobic-GA n=10 which held 40 min. walk; Resisted-GR n=10 which held 8 strength exercises, and Combined -GC n=10 which held 20 min from GA and GR. The training program was performed 3 times a week for 24 weeks. The determination of cytokines (TNF-α and Adiponectin) was performed by Enzyme –Linked Immunosorbent Assay (ELISA). Analyzes of fasting glucose (8-12 h fasting). Blood postprandial glucose were also performed (after 1 hour of a standardized meal of 300 Kcal) made in the same intervals of cytokines by means of capillary glucose using Brezze2 glucometer from Bayer. Data were analyzed by non-parametric Wilcoxon test and Kruskal-Wallis beyond the Pearson Correlation, adopting a significance level of p ≤ 0.05.

Results: The sample consisted mostly of women (n=25), mean age 66.4 ±8.7 yrs. When analyzing the impact of different training protocols on cytokines, the GR did not show changes in cytokine analyzed. In the intergroup analysis GA and GC showed a significant improvement in the values of TNF-α after the intervention (GA 12.7±1.32 vs 11.4±1.16 mg/mL p=0.001 and 13.7±GC 1.62 vs. 12.8±1.62 mg/mL p=0.000). There were no changes in adiponectin values after application of physical training protocol.

Conclusion: The protocol of combined training showed greater efficiency in regulating the levels of TNF-α in this sample, with a greater emphasis on aerobic training.
A230
Ability of a single meal composition in changing postprandial inflammatory responses
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1): A230

Background: Modern Western diet contributes to weight gain, an important cardiometabolic risk factor. In contrast, the Mediterranean diet has been associated with cardioprotection. Whether small changes in dietary habits, including Mediterranean foods, could induce metabolic benefits is unknown.

Objective: The effects of a Brazilian typical breakfast (BRAZ) and a modified breakfast with Mediterranean food (MOD) on postprandial metabolic profile and inflammatory genes were compared.

Materials and methods: This crossover clinical trial included 80 overweight individuals who received one of two isocaloric breakfasts (BRAZ: coffee, whole fat milk, french bread, butter and mozzarella cheese; MOD: coffee, 1% fat milk, wheat bread, ricotta cream, olive oil and peanuts) for 4 weeks in a random order. After a 2-week washout, individuals received the other intervention. Before and after each intervention period, individuals underwent a fat tolerance test with breakfasts. Inflammatory markers were assessed by ELISA and gene expression by PCR array. Variables were compared by repeated measures ANOVA and correlations between inflammatory and dietary data using Pearson coefficient.

Results: At the end of both interventions, participants (51.7±9.5 yrs.; body mass index of 30.5±4.2 kg/m²), did not change anthropometry, plasma glucose or triglycerides. Inflammatory markers showed that BRAZ and MOD interventions provoked, respectively, contrasting results in fasting E-selectin (13.1±5.0 to 18.1±7.0 vs. 14.2±5.9 to 13.2±6.6 ng/mL), TNF-α (3.2±1.3 to 6.1±1.9 vs. 3.4±2.1 to 2.7±1.7 ng/mL), IFN-γ (1.5±0.6 to 2.7±0.7 vs. 2.0±0.9 to 1.8±1.0 ng/mL), IL-6 (2.3±0.8 to 5.7±1.9 vs. 3.1±2.0 to 2.2±1.5 ng/mL) and IL-8 (3.7±2.4 to 4.2±2.6 vs. 5.8±4.1 to 3.8±2.5 ng/mL), and also in postprandial responses to fat test (p diet <0.01). Changes in MUFA intake and changes in inflammatory markers were inversely correlated, while changes in saturated fat intake were directly correlated to IFN-γ and IL-6. After the BRAZ and MOD interventions, differences in postprandial relative gene expression of IL-1α (2.31 vs. 0.37), colony stimulating factor 2 (1.96 vs. 0.36) and E-selectin (2.43 vs 0.68), were observed.

Conclusions: Modification of a single meal can improve cardiometabolic risk in the short-term by reducing low-grade inflammation. Changes in types of dietary fat may contribute to reduce postprandial inflammation. Our findings should motivate changes in eating habits in non-Mediterranean countries.

A231
Performance of resting metabolic rate estimation equations in obese patients
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1): A231

Background: Weight gain may be associated with an imbalance between energy intake and energy expenditure. The resting metabolic rate (RMR) is the main component of total energy expenditure, and is related mainly to

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Figure 1(abstract A229) Metabolic profile of type 2 diabetics undergoing different types of training

Figure 1(abstract A231) Prediction equations for comparison with indirect calometry in obese subjects
lean mass (LM), as well as to other factors such as fat mass (FM), age, sex and genetic factors. A RMR lower than expected may be a risk factor for weight gain. RMR is estimated by equations that use patient's weight, sex, age and height to calculate energy needs. Several studies have shown that these equations have a poor agreement with RMR measured by indirect calorimetry (IC) in obese patients once their excess fat-free mass (FFM) is usually not taken into account.

**Objective:** To evaluate the accuracy of five equations in predicting RMR in obese subjects. Results were compared with measured RMR (mRMR) determined by IC.

**Materials and methods:** Cross-sectional study was conducted in obese Southern Brazilian volunteers recruited from community. Body mass index (BMI) was calculated by dividing weight (in kilograms) by squared height (in meters). Body composition was evaluated by dual-energy X-ray. RMR was measured by IC (Weir equation) and estimated (eRMR) by Mifflin–St. Jeor, Owen, Harris-Benedict, Ireton-Jones and Horie-Waitzberg & Gonzalez (H & WG) equations (Figure 1). The latter takes into consideration the FFM. Equations performance were determined by bias (mean difference between mRMR and eRMR); precision (standard deviation of bias) and by accuracy (percentage of estimates within 5% of mRMR).

**Results:** Sixty individuals (46 women [75%], 48 white [84%]) aged 46±13 yrs. (range, 21-83 yrs.) were evaluated. Overall, mRMR was 1941±642 kcal/day. mRMR increased along with BMI (Figure 2), but the association was lost when corrected for LM (P=0.859). H & WG equation was the only equation unbiased (P=0.801) (Figure 3). The Harris-Benedict, Owen and Mifflin–St. Jeor equations were biased overall toward underestimation, while Ireton-Jones equation was biased toward overestimation (Figure 4). Bias was significantly higher in women for Harris-Benedict, Mifflin St. Jeor and Owen equations. Accuracy to estimate RMR at ±5% was suboptimal for all equations, except for H & WG.

**Conclusion:** In this sample of obese subjects, the available RMR estimate equations that do not take into account the FFM have poor accuracy when compared with mRMR.
Objective: To provide better adherence to treatment, disease control and better quality of life by reducing the risk of complications.

Materials and methods: Monthly educational meetings at a clinic for pediatric specialties, reference to disadvantaged communities of São Paulo, aimed at children with DM1 and their families. The education group in diabetes happens through group education, interactive group, educational games, cooking classes, Practice staff training patients to self-administer insulin, and self-blood glucose monitoring, physical and recreational activities with professionals from an interdisciplinary team (endocrinologist, nutritionist, gastronomy, nurse, psychologist, pharmacist, physical educator and volunteer).

Results: Reports of children and their families show that the group not only contributes to the control of the disease but makes a difference in the life of each.

“...I learned to give more freedom my daughter and so she learned to take care, to apply insulin, have more confidence, be more independent.”

“I learned to share what I know with others and learned from them too.”

“In addition to taking questions, it helps to let off steam and have more confidence.”

Conclusion: A multidisciplinary approach, using unconventional therapeutic resources (educational and recreational), if It shows extremely important in diabetes education as a way to increase awareness and acceptance of the disease, through exchanges of experience, technical skills and involvement in decision-making in relation to self-care.

A233
Performance on functional capacity tests and level of physical activity in women with metabolic syndrome
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1) 123

Background: Metabolic Syndrome (MetS) is a condition associated an increased risk for type 2 diabetes and heart disease as hypertension, high triglyceride levels, low HDL cholesterol levels, and above-normal blood glucose levels.

Objective: To assess the body composition and the responses of functional capacity influence the level of physical activity in women with MetS.

Materials and methods: This cross-sectional study consisted in 59 women, with age range from 30 to 55 yrs., were divided into two groups: I.MetS (patients with Metabolic Syndrome, n=36) and II.Control (normal subjects, n=23). The diagnosis of MetS was done through a clinical and laboratory evaluation according to the National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III). To assess the physical activity level was applied the International Physical Activity Questionnaire [IPAQ] and performed two functional tests: Step Test (ST) of 2 min and Sit-To-Stand Test and chair (STS) of 30 second, assessing the aerobic capacity exercise, functional status and strength of the lower limbs. Statistical analysis was performed by the Statistical Package for Social Sciences (SPSS-2.0). Statistical significance was accepted when \( p<0.05 \). The Chi-square Test for categorical data analysis, numeric data Spearman correlation was performed.

Results: There was no significant difference between groups I and II on the tests and in the questionnaire. In group I, 41.7% are inactive and Group II, 56.5% are minimally active \((p=0.360)\). On the ST was found an average performance of 48.5 repetitions \((p=0.597)\), and 12 repeats in the STS \((p=0.267)\) in group I. Group II 50 repetitions in ST and 13 repetitions in the STS. The Results of IPAQ questionnaire in Group I was 1732 MET and Group II 2500 MET \((p=0.744)\). There was a positive correlation between STS and TD \((rs=0.56/p=0.000)\) and between the TSL chair and age \((rs=0.684/p=0.000)\).

Conclusion: The proportion of sedentary time was strongly related to metabolic risk, independent of physical activity. The physical activity should be encouraged for both healthy people and especially for those with MetS, helping to reduce risk factors.
A high-fat, high-saturated fat diet decreases insulin sensitivity without changing intra-abdominal fat in weight-stable overweight and obese adults

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**Background:** Insulin sensitivity is improved by hypocaloric dietary interventions irrespective of whether they are low or high in fat content, but this effect may be attributed to weight loss itself rather than diet composition.

**Objectives:** We sought to determine the effects of dietary fat on insulin sensitivity in weight-stable subjects and whether changes in insulin sensitivity were explained by changes in abdominal fat distribution or very low density lipoprotein (VLDL) fatty acid composition.

**Materials and methods:** Overweight/obese adults with normal glucose tolerance consumed a control diet (35% fat/12% saturated fat/47% carbohydrate) for ten days, followed by a four week low fat (LFD, n=10: 20% fat/8% saturated fat/62% carbohydrate) or high fat diet (HFD, n=10: 55% fat/25% saturated fat/27% carbohydrate). All foods were provided and adjusted for weight stability. Insulin sensitivity was measured by labeled hyperinsulinemic-euglycemic clamps, abdominal fat distribution by MRI and fasting VLDL fatty acids by gas chromatography.

**Results:** The rate of glucose disposal (Rd) during low- and high-dose insulin, decreased on the HFD but remained unchanged on the LFD (Rd-low: LFD: 0.12±0.11 vs. HFD: -0.67±0.15 mmol/min, mean±SE, p<0.01; Rd-high: LFD: 0.11±0.37 vs. HFD: -0.71±0.26 mmol/min, p=0.08). Hepatic insulin sensitivity did not change. Changes in subcutaneous fat were positively associated with changes in insulin sensitivity on the LFD: r=0.78, p<0.01) with a trend on the HFD (r=0.60, p=0.07), whereas there was no association with intra-abdominal fat. The LFD led to an increase in VLDL stearic, palmitoleic and palmitic acids, while no changes were observed on the HFD. Changes in VLDL 22: 5n6 were strongly associated with changes in insulin sensitivity on both diets (LFD: r=-0.77; p<0.01; HFD: r=-0.71; p=0.02).

**Conclusions:** A diet high in fat and saturated fat adversely affects insulin sensitivity and thereby might contribute to the development of type 2 diabetes.
The risk of hypoglycemia during and after exercise is a concern for patients with diabetes, particularly Type 1 diabetes mellitus. A continuous aerobic exercise protocol may be beneficial for such patients. To compare the influence of different intervals of insulin administration, a study was conducted involving six patients with type 1 diabetes mellitus. The study aimed to compare the influence of different intervals of insulin administration, to identify the proportion of oxidized energy substrates at different times of continuous aerobic exercise and evaluate the relationship between oxygen uptake and glycemic variation at the end of the exercise.

### Materials and methods

Six patients with type 1 diabetes mellitus were evaluated. Each patient underwent a continuous moderate aerobic exercise protocol, with a duration of 30 min. The exercise protocol consisted of three 10-min intervals, with insulin administration at the beginning of each interval. Blood glucose levels were measured at the beginning and 10 min after each interval. No difference was found between intervals of insulin administration regarding glycemic variation at the end of the exercise. The glycemic variation (VG) was calculated for each patient, and the results were compared across intervals.

### Results

Blood glucose levels measured at the beginning of each interval were 299±48mg/dL, VO2max 40.7±9.63ml/Kg/min. No difference was found between intervals of insulin administration regarding glycemic variation at the end of the exercise. A higher carbohydrate oxidation was observed at 10min of exercise and subsequent increase in fat oxidation at 30min. Fast insulin dosis and VO2max are a good predictor of glycemic variation at the end of continuous moderate aerobic exercise.

### Conclusion

Substrate oxidation wasn’t influenced by insulin administration before exercise. A higher carbohydrate oxidation was observed at 10min of exercise and subsequent increase in fat oxidation at 30min. Fast insulin dosis and VO2max are a good predictor of glycemic variation at the end of continuous moderate aerobic exercise.

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**A236**

**Comparing the level of physical activity in women with type 2 diabetes**

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A236

**Background:** Type 2 Diabetes is a condition characterized by blood glucose levels caused by any lack of insulin or the body’s inability to utilize insulin efficiently. It develops most often in middle-aged and older adults, but may appear in children, adolescents and youth.

**Objective:** To evaluate the response of functional capacity and level of physical activity in women with type 2 diabetes.

**Materials and methods:** This cross-sectional study consisted of 34 women from the city of Londrina, with age range from 44 to 55 yrs., were divided into two groups: LD (Diabetic patients with Type 2 Diabetes, n=7) and II. Control (normal subjects, n=27). The diagnosis of diabetes was made through a clinical and laboratory evaluation. To assess the level of physical activity was applied the International Physical Activity Questionnaire (IPAQ) and conducted a functional test: Step Test (ST) 2 min to assess the functional status and strength of the lower limbs. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS-2.0). Statistical significance was accepted for p <0.05. The results showed that although not significant, there were differences in performance between groups. Physical activity brings metabolic and cardiovascular benefits and should be encouraged to minimize risk factors.

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**A237**

**A personalized booklet for progressive foot and ankle exercises: a tool for continuous care of diabetic patients**

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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A237

**Background:** Diabetes mellitus causes great impact on foot and ankle function and mobility, mainly due to polyneuropathy. A continuous functional and musculoskeletal foot care is necessary to avoid complications, ideally with individualized intervention to promote less supervised activities.

**Objective:** To develop a booklet that personalizes a foot and ankle routine of exercises according to the patients’ individual improvements, to be used by patient with diabetes.

**Materials and methods:** The development followed the Delphi method: (a) Production of the 1st version of the booklet: selection of information about self-assessment and foot care; creation of a male and female characters to dialogue with patients; selection of 7 simple and efficient exercises to increase foot strength and mobility; description of the exercises by pictures; and development of a table to control the progression of each exercise. A progression of approximately 6 levels of difficulty is available for each exercise that also differs in number of series and repetitions, body positions and materials used. After performing each exercise, patients have to classify their effort (easy, difficult, very difficult) and based on that, a progression will be made or not; (b) Professionals specialists’ assessment: a jury was composed by 8 experts in dealing with diabetes. They assessed in the booklet the adequacy of the language, quantity and quality of the functional status and strength of the lower limbs. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS-2.0). Statistical significance was accepted for p <0.05. The data numerical correlation of Spearman and Mann-Whitney and chi-square were performed.

**Results:** No significant difference between groups I and II in ST (p=0.379) and in the questionnaire (p=0.868). In Group I, 41.7% are inactive and Group II, 56.5% are minimally active (p=0.360). ST was found in a performance at the Group I of 49 (43; 55) repetitions and Group II 45 (38; 50) repetitions (p=0.379). There was a difference between the diastolic blood pressure immediately after the ST groups (p=0.027) and the Borg scale according to claim even after fatigue test (p=0.043). The results of the IPAQ questionnaire in Group I/Group II respectively were: Active 0%/ 7.4%; minimally active 57.1%/66.7% and 42.9%/29.4% inactive (p=0.556) and METS 2070/1680 (p=0.868). There was no significant correlation TD and IPAQ (rs=-0.236/p=0.180). In Group I all have the diagnosis of metabolic syndrome in Group II 63%.

**Conclusion:** Type 2 Diabetes is strongly related to metabolic risk, we found that although not significant was no difference in performance between groups. Physical activity brings metabolic and cardiovascular benefits and should be encouraged to minimize risk factors.

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**Figure 1(abstract A235)** Oxidation of substrates 1h and 2h after insulin administration

**Figure 2(abstract A235)** Oxidation of substrates at 10 and 30 min of exercise
information and pictures provided, effectiveness of the selected exercises, motivation of daily practicing as a lifestyle, and contribution to be used as a tool to facilitate the communication between patients and health care providers.

Results: Most specialists agreed (45%) or totally agreed (37%) with the content of the booklet but some changes were made according to their suggestions: (a) Inclusion of a visual effort face scale; (b) Adjust the table for controlling the exercises progression to be easier for the users; (c) Include a section to instruct health professionals about the benefits and usefulness of the booklet in a clinical setting.

Conclusion: The booklet has valuable information about diabetes complications, and can promote a personalized progress of foot and ankle exercises routine. It stimulates the adherence of a daily practice and contributes to the continuous care. A broad disclosure of the booklet would give the population practical and useful information about the disease and have the potential to promote individualized health care.

A238
Demographics factors and food consumption of diabetic patients type 1 in outpatient care of a Federal University Hospital
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1)A238

Background: Diabetes mellitus (DM) has been cited as the most challenging health problem in the 21st century. Successful management of this disease requires that we understand the lifestyle, attitudes, family and social networks of the patients being treated.

Objectives: To assess the sociodemographic, dietary practices and current food consumption among males and females with type 1 diabetes mellitus.

Materials and methods: A case-control, descriptive study was conducted in the city of Fortaleza, Brazil, applying a survey on sociodemographic, lifestyle, feeding behavior and food consumption in people treated as diabetic outpatients at the Federal University Hospital. The food consumption was collected through recall 24 h.

Results: 15 individuals were interviewed (33% male; 47% female). Mean of age was 31.3 yrs. Among educational levels was observed that 40% had finished high school and 27% had uncompleted primary education. Analyzing the occupation 40% are students or housewives and 33% are retired or self-employed. Evaluating the lifestyle, 80% do not smoke and drink alcohol. However, 73% of individuals are sedentary. Dietary aspects revealed that 73% follow a food plan, which were oriented: 73% by nutritionist, 20% for Medical and 7% follow their own guidelines. In addition, 33% performs specific diet for diabetes prescribed by a nutritionist, another 20% follow carbohydrate counting diet, 13% just do not eat sugars and food sugars and 27% do not follow a specific diet for diabetes. Most of patients, 73% answered "respect the amount of food in the diet" when questioned about the difficulties of adhering to diet." The food consumption of the group was characterized by a deficit in energy intake, adequate carbohydrate percentage energy contribution, excessive in protein, cholesterol and saturated fat. While, polysaturated and monounsaturated fat had presented a very low consumption. Fibers consumption proved to be suitable, however it was found deficiency of vitamin D, E and folate.

Conclusion: Sociodemographic studies like this are fundamental to improve the understanding of lifestyles and dietary practices of individuals with diabetes mellitus 1, being useful in proposing a better treatment strategy for these patients. Preliminary results in general show that the group requires actions of nutritional intervention to correct the dietary inadequacies, because the eating pattern indicates risk to health.

A239
The impact of nutritional counseling in the healthy diet score in type 1 and type 2 diabetes
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Diabetology & Metabolic Syndrome 2015, 7(Suppl 1)A239

Background: In the last decade in Brazil, the inadequate nutrition appears as the main risk factor for disability related chronic diseases.

Objective: To evaluate the impact of nutritional counseling in the healthy diet score in type 1 diabetes (T1D) and type 2 (DM2).

Materials and methods: Intervention study with 39 adult diabetic patients of both sexes after a year of individual clinical and nutritional monitoring, the multidisciplinary outpatient Diabetes League, 19 DM1 and DM2 20. During the research the patients were instructed to change their eating pattern according to the recommendations of the American Diabetes Association. We collected data from medical records at the first visit and one year after. Clinical, biochemical, anthropometric and food consumption were evaluated. Food consumption was assessed by a healthy diet score that classifies food into three categories of variables: Ideal (score 2), intermediate (score 1) and poor (score 0). The maximum score possible was 16, considering ideal: Daily consumption of foods rich in monounsaturated fatty acids, at least 2 servings of whole grains and 400 grams of vegetables fruits and vegetables; three times a week fish, at most once a week processed foods high in sodium, high in animal fat, fried foods and soft drinks. The score reliability test was satisfactory (Cronbach's alpha=0.614). Statistical analysis was performed with SPSS 17.0 software.

Results: At baseline the DM1 group average score was 5.89 (±2.48) and DM2 5.98 (±2.93). At end, both groups presented significant increase (p <0.05), and the average DM1 was 9.66 (±1.80) and DM2 8.24 (±2.61). There was no significant difference of the score comparing the values presented significant increase in the two groups (p <0.05). It was noted also better diabetes control in both groups after one year follow up. The DM1 used far less time insulin dosage (p=0.042), and type 2 diabetes had greater levels of HLD-c (p=0.017) and reduced systolic blood pressure (p=0.048). There were no significant anthropometric changes.

Conclusion: The nutritional and clinical follow-up, within one year, can increase the healthy diet score in diabetes, contributing to improved dietary pattern. In addition, it favored diabetes control and decrease in comorbid risk.

A240
Energy expenditure changes after Roux-en-Y Gastric Bypass
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Background: Weight loss usually decreases energy expenditure (EE) because of changes in body composition (BC). The reduction in EE may contribute, in part, to long-term weight regain. Patients undergoing bariatric surgery might experience a decrease in EE, mainly due to reduced resting metabolic rate (RMR), explained by a decreased lean body mass (LBM), similarly to what occurs to patients after diet-induced weight loss.

Objective: To assess the effects of Roux-en-Y Gastric Bypass (RYGB) on RMR and BC in severe obese patients after RYGB.

Materials and methods: This is a prospective cohort study with 28 patients who have undergone RYGB. RMR was assessed prior to surgery and 6 months postoperatively by indirect calorimetry (IC). BC was measured at these same time-points using dual-energy X-ray. RMR was adjusted for changes in body weight (BW), i.e., kilocalories per kilogram, and in free fat mass (FFM).

Results: Twenty-two female and 6 male RYGB patients had complete data at baseline and at 6 months, with a mean age of 42±11 yrs., a mean body mass index (BMI) of 49.9±23 kg/m² and a mean BW of 128±19 kg, half of which composed by fat mass (FM) (50±5%). The mean RMR was 2218±595 Kcal/day. Baseline RMR correlated with FFM (r=0.635; P<0.001) (Figure 1); therefore FFM explained about 40% of the variance of RMR. The coefficient of variation (CV) of RMR was 20.8%. The correction of RMR by FFM reduced the CV to approximately 14%. At 6 months, the percentage of excess weight loss was 46±12%. The FM decreased significantly (19±5%; P<0.001), as well as FFM (17±16%; P<0.003), FM/RMR (145±578; P<0.001; Figure 2). The BW-adjusted RMR was unchanged post-RYGB (P=0.223). RMR adjusted for BW was negatively correlated to the total percentage of body fat preoperatively (r=-0.549; P=0.028).

Conclusion: Weight loss following RYGB Results in FM as well as LBM reduction, which lead to decrease RMR. Such decrease in RMR may limit weight loss over time and even favor weight regain.
Frequency of fetal anomalies from pregnant rats with mild diabetes submitted to moderate intensity exercise program

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Background: The practice of exercise for diabetes control is common, also during pregnancy. However, its potential benefits and risks of exercise during pregnancy, complicated or not by diabetes, is unknown.

Objective: To evaluate the fetal anomaly frequency from mild diabetic pregnant rats submitted of exercise of moderate intensity.

Materials and methods: The experimental severe diabetes was induced in newborn female Wistar rats in the first day of birth by intravenous injection of Streptozotocin in a dose of 100 mg/Kg. In adult life (110 days) the rats were submitted to oral glucose tolerance test (OGTT) to confirm the moderate diabetes. After its confirmation, rats were mated and randomly assigned to 4 experimental groups (minimum n=13...
Behavior of blood glucose diabetes type 2 on the cardiac stress test: a new paradigm? What is its importance?

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Background: Cardiac Stress Test (CST) is a maximal exercise test inexpensive, wide applicability and effectiveness tests in analysis with diabetics. During a brief maximal exercise embodiment hepatic glucose production increases from two to five times increasing the glucose levels. Objective: To analyze the behavior of blood glucose of type 2 diabetics during exercise testing.

Materials and methods: Pre experimental design study, duly approved by the Ethics Committee No. 775654. Through a sample test were selected 51 diabetic patients of both genders, aged between 50 and 70 yrs. who did not use insulin therapy and/or use of beta-blocker drugs. The CST was carried out under the supervision of a medical cardiologist, in the morning, with a maximum interval of two h between the last meal. A treadmill with incline option was used, obtaining the electrocardiographic recordings were used via 12-lead system, and protocols were selected individually. The capillary glycemic (CG) was measured before and immediately after every effort obtained in CST. Statistical analysis was performed using the Wilcoxon test and Spearman correlation, adopting a significance level of p=0.05.

Results: CG rate above 150 mg/dL was 52.9%. The behavior of the CG immediately after every effort obtained in CST, showed a significant decline (175.2±83.2 vs 159.6±78.2 p<0.00). The heart rate (HR) Maximum evaluated showed significant correlations compared to the percentage of effort made (153.0±12.6 vs 97.1±6.2% rs=0.78 p=0.00), with the HR submaximal expected (153.0±12.6 vs 133.2±7.0 rs=0.55 p=0.00), and the maximal HR for (153.0±12.6 vs 157.3±8 3 rs=0.56 p=0.00).

Conclusion: CG behavior presented itself contrary to the vast majority of existing literature. Apparently the action of exercise on CST and the route of independent glucose uptake of insulin are effective for descendants glycemic responses. However more studies are needed to investigate possible mechanisms responsible for this outcome. It also needs attention the realization of the extent of CG before and after CST, since the discrepancy (hyperglycemia/hypoglycemia) glucose levels by diabetics presented before the CST in order to avoid potential acute clinical complications related to diabetes.

Correlation of execution time of the walking test between force platform and BESTest in diabetic individuals

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Background: Type-2 diabetes mellitus is considered a great problem of public health, resulting in complications such as deficits in functional performance of the lower limbs and falls consequently, which can interfere with the balance maintenance.

Objective: To assess the gait of type-2 diabetic individuals by correlating the Balance Evaluation System Test (BESTest) for clinical balance evaluation on plane surface and the Walk Across test on Neurocom Balance Master Sistem® platform.

Method: Forty-two type-2 diabetic male and female volunteers aged between 45 and 64 yrs. old were recruited for study, all with their glycaemic levels controlled and being physically active. Gait was assessed as follows: 1) gait test on plane surface for clinical balance evaluation (BESTest) and 2) Walk Across test on Neurocom Balance Master Sistem® platform at distances of 6 m and 1.5 m, respectively. Analyses: Data distribution was verified with the Shapiro-Wilk test and application of Pearson’s correlation at significance level of 5%. Magnitude of the correlations was based on the Munro’s classification (low: 0.26 to 0.49; moderate: 0.50 to 0.69; high: 0.70 to 0.89; very high: 090 to 1.00). For data processing, the SPSS software version 17.0 was used at significant level of 5%.

Results: Forty-two diabetic male and female subjects with mean age of 55.2±6.4, mean height of 1.65±0.08m, and mean BMI of 80.64±13.9Kg were assessed. Significant positive and moderate correlations (r=0.574) were found between the times (in seconds) taken for the distances covered in the platform (2.43±0.44) and BESTest (6.32±1.33).

Conclusion: Considering the correlation at execution time between BESTest and Balance Master Sistem® platform, we suggest the use of balance evaluation system test (BESTest) for clinical balance evaluation on plane surface instead of the Walk Across test, since the former is of low cost and ease to be applied, thus having broader range and more
availability for gait assessment in the clinical practice. However, we emphasise that further studies on this theme should be carried out, since the correlation was found to be moderate.

**PERSPECTIVES AND NEW TECHNOLOGIES**

**A244**

Evaluation of the influence of the genetic background in tissue repair in diabetic mice

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Background: Studies with genetically different strains of mice showed different responses for diabetes, glucose levels and insulin levels. Several experimental models have shown that wound healing and angiogenesis are phenotypes dependent on the collection of genes present in an organism. However, we found no study that investigated the influence of genetic heterogeneity in the process of inner healing in diabetic animals.

Objectives: Evaluate the influence of genetic background in the components of repair process (angiogenesis and inflammation) induced by synthetic matrix in mice with type I diabetes (Swiss, Balb/C and C57).

Materials and methods: Angiogenesis and inflammation were assessed at 10 days after implantation in polyether-polyurethane sponge discs implanted subcutaneously in female Swiss, C57, and Balb/c control and diabetic mice induced by streptozotocin (STZ; n=10).

Results: The strains responded distinctly to the diabetogenic treatment as assessed by fasting glucose levels (Swiss CT=134.0±3.8 vs STZ=455.4±14.51; C57 CT=135.4±6.2 vs STZ=393±21.7; Balb/c CT=118.4±4.0 vs STZ 190.0±10.46). Hemoglobin content, (µg/mg) in implants of Swiss diabetic animals decreased by 59% compared with the control group. The diabetogenic treatment did not alter this parameter in the other two strains. In all strains the number of vessels was decreased in implants of diabetic animals compared with their control groups (Swiss CT=47.5±14.8 vs STZ=6.5±3.3; C57 CT=47.5±6.2 vs STZ=5.0±1.9; Balb/c CT=39.5 ±11.4 vs BSTZ 10.0±3.5). In contrast, VEGF levels (pg/mg) were increased in implants of Swiss and C57/BL diabetic mice. The inflammatory parameters (Myeloperoxidase-MPO; N-acetyl-B-D-glucosaminidase-NAG and NO) were markedly influenced by the genetic background. In implants of Swiss and Balb/c diabetic animals, MPO increased, but NAG activity was lower in implants of Swiss diabetic mice. Furthermore, the levels of nitric oxide were also reduced in implants of all diabetic mouse strains. The inflammatory cytokines (TNF, CCl2 and KC) also showed distinct profiles after the diabetogenic treatment.

Conclusion: The genetic background influenced the systemic and local response to the diabetogenic treatment in the strains of mice evaluated. Swiss mice were the most affected strain analyzed whereas the least was the Balb/c. These important strain-related differences to diabetes must be considered in the design and analysis of studies internal healing hyperglycemic environment.

**A245**

Homologies between Bauhinia forficata Link subsp. pruinosa and pancreatic beta-cell specific transcriptional activator: a starting point for drug design new in diabetes?

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Background: Diabetes mellitus (DM) is a chronic disease with an ever-increasing incidence in world and has become the object of scientific research into the search for novel therapeutic alternatives. Bauhinia
The purpose of this study is to explore the possible homology between the AA sequences of ribulose 1,5-biphosphate carboxylase large subunit, partial (chloroplast) [Homo sapiens], and studies on this plant are important to the safe, effective development of pharmaceutical products for the treatment of diabetes.

**A246**

**Improving the identification of mody mutations by using mlpa technique in the molecular diagnostics routine**

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**Materials and methods:** Were performed the comparison between the AA sequence of the GenBank: CA490419.1:ribulose 1,5-biphosphate carboxylase large subunit, partial (chloroplast) [Homo sapiens], available in the database of NCBI with the Basic Local Alignment Search Tool (BLASTp) software.

**Results:** The homology between the ribulose 1,5-biphosphate carboxylase large subunit, partial (chloroplast) [Homo sapiens:forficata subsp. pruinosa] and the pancreatic beta-cell specific transcriptional activator [Homo sapiens], available in the database of NCBI with the Basic Local Alignment Search Tool (BLASTp) software.

**Background:** Maturity-onset diabetes of the young (MODY) represents about 3-5% of cases of diabetes mellitus (DM). Searching for mutations can be performed either by Sanger sequencing or Multiplex Ligation-dependent Probe Amplification (MLPA) technique. MLPA is a powerful molecular tool that identifies large genetic rearrangements such as deletions and insertions, even though these kinds of mutations seem to be rare in the majority of MODY subtypes.

**Objective:** To assess the role of the MLPA technique in the genetic screening of GCK-MODY (MODY2), HNF1A-MODY (MODY3) and HNF1B-MODY (MODY5) in cases negative for point mutation using Sanger sequencing.

**Materials and methods:** Thirty-one clinically suspected MODY cases according to the guideline criteria that were investigated using Sanger method and were negative for GCK, HNF1A, and HNF1B point mutation, were tested using MLPA. We applied Coffalyser® software for graphical and statistical analysis.

**Results/description:** Among 12 cases investigated for MODY’s, we identify a heterozygous whole deletion of the HNF1B gene in one patient. This patient had a typical phenotype of HNF1B-MODY with familiar DM and urogenital tract abnormalities, including renal cysts. He was initially negative for MODY mutation by Sanger sequencing. Although partial gene deletions or duplications account for less than 10% of all disease-causing mutations in hereditary conditions, these mutations can be responsible for up to 40% in HNF1B-MODY. Gross genomic rearrangements are rare in most common forms of MODY such as GCK-MODY and HNF1A-MODY.

**Conclusion:** MLPA should be added in molecular diagnostics routine for HNF1B-MODY, in which this technique identifies large genetic rearrangements frequently observed in this MODY subtype.
concordance (Kw=0.79) for the intra-examiner analyses for most of the points studied on both feet.

**Conclusion:** The plantigraphy with a specific computer program to analyze the footprints feature ease of handling and low cost, it may represent an important social impact.

**A249**

**Co-culture of human pancreatic islets with human adipose-derived stromal/stem cells can improve islet quality in vitro**

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**Background:** In patients with unstable type 1 diabetes mellitus (T1D), allogeneic pancreatic islet transplantation is a therapeutic option to restore insulin secretion and improve metabolic control. However, the success of islet transplantation is dependent on the number and quality of isolated islets.

It is known that the inflammatory environment related to the donor’s brain-death (BD) and the stress induced during islet isolation reduces islet quality. Adipose-derived stromal/stem cells (ASC) are multipotent cells that release several trophic factors with anti-inflammatory and cytoprotective actions. Thus, in vitro co-culture of islets with ASCs may improve islet quality isolated from BD-donors, attenuating inflammation and apoptosis.

**Objectives:** To evaluate the effect of co-culture of human pancreatic islets with human ASCs in an indirect contact system has on the improvement of islet quality in vitro.

**Materials and methods:** Human islets were isolated according to the method described by Ricordi et al. (1989). ASCs were isolated from liposauges using the protocol established by Zuk et al. (2001). All patients (for adipose tissue samples) and donor’s relatives (for pancreas) signed an informed consent form. Islets were cultivated alone or in indirect contact with ASCs using inserts in 6-well plates for 24h, 48h and 72h.

Viability was determined by FDA/PI staining and function was evaluated by glucose stimulated-insulin secretion (GSIS). Gene expressions of HIF1α (anti-hypoxia), HMOX1 (cytoprotector) and XIAP (anti-apoptotic) were evaluated by RT-qPCR.

**Results:** Islets co-cultured with ASCs demonstrated higher viability and GSIS indexes after 72h than islets cultured alone (viability: 95.2±2.8 vs 89.5±3.6; P=0.046; GSIS: 1.6±0.7 vs 1.0±0.1; P=0.01). Co-cultured islets seem to have increased HIF1α expression as compared to islets alone [6.7±5.9 vs 3.2±2.0 arbitrary units (AU), P=0.058]. Moreover, XIAP expression was increased in islets alone as compared to the 72h co-culture condition (4.3±0.5 vs 3.0±0.5 AU; P=0.03). HMOX1 expression was similar between groups.

**Conclusion:** These preliminary results indicate that co-culture of pancreatic islets with ASCs promotes an improvement on islet quality. Thus, co-culture prior to clinical transplantation may be a viable option for improving islet quality and, consequently, the success of islet transplantation.

**References:**

**A250**

**Cortistatin hyperpolarizes pancreatic beta cell membrane and reduces glucose-stimulated insulin secretion**

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**Background:** Cortistatin-14 (CORT) is a neuropeptide commonly expressed in inhibitory neurons of the central nervous system (CNS) with structural, pharmacological and functional similarity to somatostatin (SST). In addition to having roles in the CNS, both peptides also regulate endothocrine secretion. Yet the cellular mechanisms supporting this role are not well understood.

**Objectives:** We studied the potential role of CORT in pancreatic beta and alpha cells function.

**Materials and methods:** Isolated islets and primary pancreatic beta cells from lean C57BL6 mice were used for determination of functional and electrophysiological parameters.

**Results:** Using insulin and glucagon secretion protocols with fresh islets isolated from C57BL6 mice, we observed that CORT reduced the glucose-stimulated insulin secretion (GSIS) in a similar magnitude from that of SST (p<0.01), an effect mediated by SST-R5 receptor. Glucagon secretion in response to 0.5 mM glucose was completely abrogated in the presence of CORT (p<0.001), as well as for SST. Beta cell function were further investigated and we observed that the reduction in insulin secretion was paralleled by a decrease in the glucose-induced calcium levels observed by fura-2 calcium imaging (p<0.001). As opposed to the effects on SST, the effect of CORT in beta cell calcium load was blocked by specific SST-R5 receptor antagonist, suggesting a higher affinity of CORT for this receptor.

In addition, CORT reduced beta cell membrane potential and abolished action potential firing in perforated patch clamp experiments (p<0.001). CORT also diminished calcium currents in whole cell patch clamp experiments.

**Conclusion:** Our results suggest that the binding of CORT to SST-R5 receptors Results in beta cell hyperpolarization and impairs calcium channels activity, thus reducing the beta-cell stimulus secretion coupling.

**A251**

**A single session of aerobic or resistance exercise modifies the endothelial progenitor cell levels in healthy subjects, but not in individuals with type 1 diabetes**

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**Background:** Endothelial progenitor cells (EPCs) from the bone marrow can regenerate the endothelium. In type 1 diabetes (T1D), EPCs are reduced as compared to healthy subjects, possibly accelerating endothelial dysfunction. Exercise mobilizes EPCs from bone marrow in some populations, but in T1D this was not previously studied.

**Objective:** To evaluate the acute effect of aerobic (AE) and resistance (RE) exercise sessions on peripheral blood EPCs, blood flow (BF), vascular resistance (VR) and reactive hyperemia (RH) in patients with T1D.

**Materials and methods:** We conducted a crossover randomized clinical trial, where 14 men with T1D and 5 healthy controls were randomly assigned to a 40-min AE session (60% VO2peak) and a 40-min RE session (60% maximal load), 1 week apart. Venous blood was collected 10 min pre and post-exercise sessions to evaluate circulating EPCs (percentage of CD34+/KDR+/CD45dim of 200.000 mononuclear cells gated and analyzed by flow cytometry). Forearm BF and RH were evaluated by venous occlusion plethysmography before and after the sessions. Generalized Estimation Equation adjusted for baseline values was used.

**Results:** Patients were 30.3±1.6 yrs-old, HbA1C 7.7±0.2%; controls were 26.8±2.3 yrs-old. Exercise did not change EPCs in T1D [AE (-5.075±0.250 vs. -5.303±0.250, P=0.102); RE (-5.217±0.250 vs. -5.056±0.250, P=0.310)]; EPCs decreased after AE (-4.383±0.353 vs. -4.854±0.353, P=0.017) and increased after RE (-5.270±0.353 vs. -4.629±0.353, P=0.004) in controls. Blood flow increased after RE in patients with diabetes (28.7±11.4%, P=0.009) and controls (41.7±18.5%, P=0.024). Reactive hyperemia was increased after AE (36.5±7.3%, P=0.01), and RE (42.0±10.0%, P=0.001) in patients with diabetes and controls (AE: 35.4±11.0%, P=0.001; RE: 74.3±33.0%, P=0.005).

**Conclusions:** Despite the increases in RH in all subjects after both exercise sessions, EPCs were only influenced by exercise in controls. The unchanged number of EPCs in diabetes after both exercise protocols might indicate a blunted endothelium regenerating capacity, revealing a
very early deterioration of the functional arterial characteristics not disclosed by only evaluating vascular functional variables.

A252 Evaluation of acute oral toxicity of red alga (Gracilaria domingensis sonder ex kützing) in mice CSTBL/6
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Background: Many species of plants have been used pharmacologically to treat the symptoms of diabetes mellitus. However, it is influenced by the toxicity and the plant extract used in the preparation, method of preparation and administration route, so it is important to identify potential risks regarding the toxicity of the product to be used. The red alga (Gracilaria domingensis) is a source of minerals, vitamins, fiber and low in lipids, and may contain anti-hyperglycemic activity, contributing thus in control of DM. Therefore, it becomes necessary to carry out acute toxicity tests to evaluate the red algae is safe for therapeutic use.

Objective: To evaluate the acute toxicity of red algae in healthy mice.

Materials and methods: A flour of algae was obtained by drying in an oven at 45 °C with forced air circulation, followed by grinding. Twelve adult females CSTBL/6 mice, weighing 22-25g, were used in this study. The experimental protocol of this study was submitted and accepted by the Ethics in Animal Research Committee (EARC) with number 90/10. The mice were divided in 2 groups (n=6) and fasted for 4 h. After this period, was administered by gavage, saline (1 mL/kg) to the control group, and the solution of algae at a dose of 2000 mg/kg to the test group, followed by behavioral observation of the animals at 30, 60, 90, 120, 150, 180, 210, 240, 270 and 300. After twelve days the animals were euthanized for removal and analysis of the relative weight vital organs to check for acute toxicity. The analysis of the significance of differences between the data was performed using nonparametric Mann Whitney, considering significant Results that had p <0.05.

Results: Deaths in the acute toxicity evaluation of red algae had not been registered in a dosage of 2000mg/kg in both groups, during the experiment. There were no significant changes in the Hippocratic screening, in macroscopic analysis of the organs, in physiological parameters, thus emphasizing the low toxicity of the algae solution. Also there was no statistically significant difference in analysis of the concerning weight vital organs, which confirms the low toxicity of the red alga (Figure 1).

Conclusion: Given the above Results, it is concluded that the administered solution of the red algae does not have toxic effects and is safe for therapeutic use.

A253 Prototype of an educational device for supporting and monitoring the treatment of type two diabetes mellitus
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Background: Diabetes mellitus is considered an ongoing epidemic. Studies link poor adherence to treatment and encourage the development and implementation of technologies related to primary care of the disease.

Objectives: To present the prototype of an educational and monitoring device to be used by patients with type two diabetes mellitus.

Materials and methods: A prototype with four main components has been prepared: an Arduino Mega 2560 with a microcontroller board to prototype the device hardware and program components, an LCD display with integrated resistive touchscreen, used to make the interaction with the user, a buzzer tone generator for audible alert and AA batteries as a power source. Based on the Tamagotchi’s method of use, toy which creates a virtual pet, a virtual pet has been created called “Togushi” for user interaction.

Results: The Arduino development environment and programming language was used. Libraries that allow the date and time setting, alarm management, writing and drawing on the screen were installed. The prototype features a informing on diabetes mellitus and its treatment function, it also alerts the weight times for taking medication and registers the patient’s personal characteristics (weight and height, for example). It features password security mechanisms and data encryption and a restricted area, via the web platform for access and monitoring by health professionals. It is an open source system, reusible, flexible and cost effective and can be adapted to other contexts and research in the health area.

Conclusion: So far has not been found a similar educational device in Brazil for patients with the disease. The prototype is a great aid for the monitoring of patients with type 2 diabetes through health education.

A254 Assistive technologies for diabetes care: a personalized software for progressive foot and ankle home exercises
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Background: Assistive technologies for DM management and monitoring are powerful tools for motivation and adherence to the desirable treatment and lifestyle [1]. Losses in foot and ankle due to diabetic polyneuropathy (DPN) require a continuous care since the disease diagnosis, especially to maintain function and mobility and avoid later consequences such as ulcers [2].

Objective: To develop a free software that personalizes a foot and ankle routine of exercises according to the patients’ individual improvements. Materials and methods: Webapp system which uses Responsive Design, developed in PHP, in English or Portuguese. It was designed for Web online or off-line access, with applications also for smartphones (Android or iPhone) that integrates the progression of the exercises with the software. It was designed for users that do not have high speed connection with internet or have variations of the speed. Results: The software – SAEDD (3)– presents sessions about: a) DM and foot care recommendations; b) Foot self-assessment: the patient can choose from a list of foot problems (blister, tissue discontinuity, crack, callus, toes deformities-claw, hammer or hallux valgus-liquid, loose or fallen nail, bleeding, pus, and skin color-black, red or white) and drag and place a marker over 5 different views of the foot; c) Foot and ankle exercises: each person starts the training according to a list of selected exercises, which are described in a step-by-step video, photo and written information. A progression of approximately 8 levels of difficulty are available for each exercise that also differs in number of series and repetitions, body positions and materials used. After performing each exercise, patients have to score its effort in a visual 0-10 analogic scale. Every 5 days of training, an algorithm adjusts the progression level of the next exercises series, depending on the effort score given. For visual feedback of each exercise, a graph presents the percentages of the finished and the remaining levels.

Conclusion: SAEDD can be recommended by health care providers to facilitate self-monitoring and promote home-based exercises. It helps the patient to be independent in the treatment, and has the main benefit of progressing according to the own patient’s possibilities, which is a closer situation to a supervised therapy.

References
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A255
Evaluation of the acute toxicity oral of carnauba powder (PCO-C) in mice C57BL/6
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Background: Some plants associated with the treatment of diabetes are considered toxic because the hypoglycemic effect is often result of hepatotoxicity and β-adrenergic blockade. The Carnauba Powder produces a yellowish solid named PCO-C, which is predominantly composed of esters of cinnamic acid and has a chemical structure very similar to other compounds that have been described in the literature with a significant hypoglycemic effect, such as gamma-oryzanol and policosanol. Therefore, it is necessary to carry out acute toxicity tests to assess the PCO-C is safe for therapeutic use.

Objective: The aim of the present work was to assess the acute toxicity of PCO-C in healthy mice.

Materials and methods: To obtain the PCO-C, the same were extracted and isolated from the dust of unopened leaves of the carnaubeira, yielding a yellowish solid. Twelve C57BL/6, male mice between seven and eight weeks old, which were kept under temperature 22 °C in light-dark cycle (12 in 12 h) and received standard chow and water ad libitum.
The Ethics Committee on Animal Research approved the experimental protocol (no. 90/10) of this study. The mice were divided into 2 groups (n=6), saline and PCO-C, and was fasted for 4 h. After this period, they were administered, by gavage, saline (1 mL/Kg) and PCO-C solution in the dose of 2000mg/Kg. The animals had their behavior observed in the times 30, 60, 90, 120, 150, 180, 210, 240, 270 and 300 min after the end of gavage. After the behavioral observation of the animals, their weight was daily measured for 12 days. After this period, the animals were euthanized to removal and analysis of the concerning weight vital organs to check for acute toxicity. The analysis of the significance differences between the data was performed using nonparametric test of the Mann Whitney, considering significant Results that had p <0.05.
Results: No death was recorded and no significant change from the Hippocratic screening in the toxicity acute evaluation of the PCO-C in the dose of 2000 mg/Kg. Both groups had similar behaviors throughout the experiment. Also, there was no statistically significant difference in weight analysis concerning the organs (Figure 1), demonstrating the low toxicity of the PCO-C.

Conclusion: The results indicate that the PCO-C does not have toxic effects and is safe for therapeutic use.

A256
Detection of foot at risk of ulceration using a new version of the sisped software in type 2 diabetes patients in a primary care setting
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Background: The diabetic foot continues to generate high financial and psychological costs and a lot of preventive actions have been tried in an attempt to achieve better indicators. In Sergipe, the software SISPEDR was created to facilitate the foot examination of the patient with diabetes mellitus, and due to the need of some update, a new version was made.

Objective: This study aimed to stratify the foot at risk in the first patients who used the second version of SISPED.

Materials and methods: We evaluated 1076 patients assisted in the primary care set (SUS). The research was conducted by personal data collection and clinical protocol, evaluating signs, symptoms and test results following the latest recommendations of the Brazilian Diabetes Society (SBD) and the International Consensus of Diabetic Foot.

Results: Patients had an average age of 63,10±12,32 yrs., predominantly female (63.5%), and all of them had type 2 diabetes. The mean of HbA1C was 8.31±2.03. Most of them had a foot at risk 1 (60.9%) and only 9.8% had risk 0. Risk 2 was present in 39% of the patients and 8.7% of the patients had risk 3. The presence of active ulcers was 3.2% and scaly foot, mycosis and ringworm were present in approximately 70% of patients.
Discussion: Our study has shown a significant amount of diabetic patients with foot at risk in accordance with the reality of developing countries, which reinforces the need for intensive prevention of the diabetic foot. The SISPED, in its second version, was shown to be effective in helping to prevent the diabetic foot and to choose the most appropriate care.

Conclusion: Given the current reality, intensive interventions are mandatory to contain the progression of the damage resulting from diabetic foot complications. It is in this context that the SISPED, now in its second edition, has proved to be an effective tool in minimizing the impact of diabetic foot.

A257
Next-generation sequencing in Brazilian MODY patients: a pilot study
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Background: Maturity-Onset Diabetes of the Young (MODY) is the most common form of monogenic diabetes. Genetic analysis is required to confirm the diagnosis. Conventional genetic testing uses Sanger sequencing. Currently, Next-generation sequencing (NGS) has proven to be cost-effective. To date, there is no NGS study for MODY in Brazil.

Objective: To validate a new assay for molecular diagnosis of MODY using targeted-NGS.

Materials and methods: We have completed a pilot project including 7 unrelated subjects with MODY phenotype. Genetic sequencing was performed using Illumina NGS platform (MiSeq), allowing analysis of 13 MODY genes simultaneously. All exonic and intronic regions of these genes were evaluated. Two cases were not tested before. In other 5 cases, a previous analysis using Sanger sequencing of GCK and HNF1A genes had been done. Three subjects had already a genetic diagnosis of MODY by Sanger method and were selected to validate NGS Results. And the other 2 cases had typical clinical features but negative Sanger analysis.

Results: In all 7 cases analyzed, NGS was able to detect the mutations related to MODY, and in those 2 previous negative Sanger sequencing, it has allowed us to confirm the diagnosis of this type of diabetes (Figure 1). Considering these 2 negative Sanger cases, one had a mild hyperglycemia detected at 15 yo, non-progressive during 4 yrs. of follow-up, normal C-peptide, negative beta cell antibodies, and also a family history of similar phenotype. Previous Sanger testing for GCK had yielded a false negative result, because the mutation was a large deletion located at the end of the last exon of GCK, which impaired the analysis by Sanger, however was detected by NGS. The second negative Sanger subject had diabetes since 8 yo, low BMI, negative antibodies, detectable fasting C-peptide, and a mother with asymptomatic hyperglycemia. This patient had been using sulfonylurea with good glycemic control. Sanger sequencing for HNF1A was negative. NGS identified a mutation in GCK, already described in the literature as pathogenic.

Conclusions: In our pilot project, targeted-NGS was able to confirm MODY diagnosis in all cases submitted to Sanger sequencing (3 positive controls and 2 previously negative cases). In other two not tested before, this new method could identify the pathogenic variants. Thus, NGS can be considered an effective tool for diagnosing clinical suspicious cases of MODY, appearing to be a promising technique.

A258
Short message service phone reminder as an important tool to reduce absenteeism for attendance at healthcare appointments
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Background: Absenteeism, or missing scheduled appointments is a serious problem to the healthcare system, affecting healthcare institutions that cannot maximize their staff appointments, thus increasing their costs, and also to patients, who face difficulties in accessing the system.
The aim of this study was to assess whether sending scheduled appointment date reminders through Short Message Service (SMS) for attendance at a healthcare unit would reduce the absenteeism in our institution.

Materials and methods: The study enrolled patients who scheduled appointments with an interdisciplinary team (up to 5 scheduled appointments per shift), from January-December 2012, before the SMS reminders, and compared to January-December of 2013 and 2014. Absenteeism was analyzed by the total number of patients scheduled appointments (TSA), compared to the absences at the appointed date and also the number of health care providers scheduled appointments (NSA) compared to the team’s idle time during the study period. The SMS was sent a week before the appointment date.

Results: In 2012, before the SMS intervention, TSA absenteeism was 20.0±3.3% (7736 scheduled patients/1524 no-show patients), in 2013 was 15.9±2.1% (7509/1199) and in 2014 was 15.4±1.8% (7285/1118). A TSA absenteeism reduction of 20.5% (p=0.0024) was observed in the first year of the intervention and of 23.0% (0.0004) in the second year. The NSA absenteeism in 2012 was 14.9±1.9% (17196 scheduled appointments/2510 idle time), in 2013 was 11.9±1.9% (16674/1988) and in 2014 was 11.5±1.7% (17867 /2024). During the study period, there was an idleness reduction of TSA (2012: 127±14.7, 2013: 99±9.190 and 2014: 93.2±17.9, p=0.0003) and NSA (2012: 209.2±26.6, 2013: 165.7±41.9 and 2014: 168.7±31.4, p=0.0052).

Conclusion: The use of phone reminders with scheduled appointment dates through SMS was effective in reducing healthcare absenteeism, being an important tool to optimize the services offered by the institution.

Insulin topical modulates inflammatory phase and the angiogenesis of the burns wound healing in diabetic-induced rats

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Background: Burns are wounds caused by exposure to an agent from thermal, electric, radioactive or chemistry origin which presents attenuated inflammatory response, becoming even more compromized when associated to diabetes mellitus. Despite the fact from experimental evidences demonstrating tissue healing and reconstruction acceleration due to topical insulin used in diabetic and control rats with incised wounds and burn wounds in diabetic rats, however there is no information regarding molecular and cellular mechanism of topical insulin upon burn wounds.

Objective: Our aim was to investigate the chemical mediators involved in inflammation and proliferation of topical insulin on wound healing following 2nd degree burns in diabetic rats.

Materials and methods: Rats were divided into two groups: diabetic rats treated with placebo (DP), and diabetic rats treated with topical insulin (DI). We induced second-degree cutaneous burn wound in streptozotocin-induced diabetic rats with a 1.0-cm diameter circular mold, 120°C, during 20 seconds. Burned rats received either placebo cream or topical insulin (PI 0705370-3), once a day. At 7th and 14th days after the wound induction, anesthetized animals had seen extraction of skin wound sites for Elisa, immunohistochemistry, imunoblotting analysis and Weigert staining.

Results: Treatment with topical insulin induced early enhancement of macrophages infiltration in the wound surroundings detected by MCP-1 and F4/80 antibodies at day 7 and increased in KGF expression (p<0.05), when compared to DP. At 14th day after burn induction accompanied by enhanced angiogenesis, detected with VEGF and TGF-β1 antibodies; increased expression of alpha smooth muscle actin, present in mature blood vessels; increased cell proliferation, detected with Ki67 antibody on groups treated with topical insulin (DI), when compared to DP.

Conclusion: There was also increased elastic fibers deposition along the granulation area. Herein we demonstrated that cutaneous treatment with topical insulin accelerated wound healing in the diabetic group by increases the activity of macrophages, promoting angiogenesis and elastic fibers deposition.

Detection of congenital generalized lipodystrophy mutations by next-generation sequencing: time for a new approach

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Background: Congenital generalized lipodystrophies (CGL) or Berardinelli-Seip Congenital Lipodystrophy (BSCL) are rare autosomal recessive disorders with reduction of subcutaneous and visceral adipose tissue, associated with deregulation of lipidic and glycemic metabolism, most of them developing insulin resistance and diabetes mellitus during the second decade of life. There are four CGL syndromes described (CGL-1 to 4) caused by mutations in AGPAT2, BSCL2, CAV1 and PTRF. The mutations in AGPAT2 and BSCL2 are responsible for 95% of reported cases worldwide and 87% in Brazilian reported cases. BSCL2 variants usually lead to more severe symptoms in comparison to AGPAT2 ones.

Objective: To report the genotype from 5 different CGL patients using next-generation sequencing (NGS) approach.

Materials and methods: We have studied 5 unrelated individuals with CGL. Physical evaluation and biochemical measurements were performed in all patients. CGL genes were analyzed using NGS with complete sequence coverage of the coding regions and splice junctions. We have used a diabetes monogenic panel that included familial partial lipodystrophy genes and the four CGL genes (AGPAT2, BSCL2, CAV1, PTRF).

Results: Genetic analysis identified disease-causing previously described variants in all 5 studied patients: 3 in gene AGPAT2 and 2 in BSCL2. The three AGPAT2 variants found were c.66A>T/p.K22*; c.493-2A>G/IVS4 and g.15373_16409del1037/c.366_492+910del1037 and the two BSCL2 were c.412C>T/p.R138* and c.393_193delinsGGA. All patients had generalized fat loss in first year of life; 100% had hypertriglyceridermia and 80% (4/5) precocious diabetes mellitus, 3 of them with high insulin doses intake. Four in five patients (80%) had hepatomegaly and 60% (3/5) had hepatic steatosis. Both patients with BSCL2 mutations had cardiac complications.

Conclusions: As clinical phenotype varies among molecularly distinct forms of CGL, understanding molecular defects is helpful in genetic counseling and prenatal diagnosis of affected families and in improving specific therapeutic interventions. We have developed a NGS panel including all known genes causing CGL so far. A NGS approach allows saving time and possibly cost in identifying the etiology of CGL, leading to a better follow-up of each patient.

Cite abstracts in this supplement using the relevant abstract number, e.g.: Riquetto A., et al. Detection of congenital generalized lipodystrophy mutations by next-generation sequencing: time for a new approach. Diabetology & Metabolic Syndrome 2015, 7(Suppl 1):A260