P-540-131

Diabetic ketoacidosis in children: retrospective study

Z. Imane[1], H. Khabba[1], S. Amhager[1], N. Benani[1], A. Gaouzi[1] & A. Balafrej[1]
[1]*Children's Hospital of Rabat, Unit of Diabetes and Endocrinology, Rabat, Morocco*

Diabetic ketoacidosis is a metabolic emergency and a major cause of morbidity and mortality in children with diabetes.
Objectives: The aim of our study is to evaluate the epidemiological, clinical, biological, evolutionary, and the therapeutic management of children with DKA.
Methods: Our retrospective study concerns the study of 79cas acid-ketotic decompensation admitted to the pediatric diabetes unit at Children's Hospital of Rabat during the years 2008–2009. Our study is based on the analysis of anamnestic, clinical, laboratory and treatment of each case.
Results: The age of our patients ranged between 7 months and 16 years 4 months with two peaks of high incidence of ketoacidosis: the first in children under five and the second between ages 11–16years, no sex predominance. The study shows a family of first-degree consanguinity in 21% of cases, diabetes in 40% of familial cases. Ketoacidosis is opening in 83.5% of cases. The clinical symptoms are varied: polyuria-polydipsia syndrome was found in 89% of patients followed by digestive disorders. Disorders of consciousness are present in 28% of our patients with three cases of coma. The hydration status was correct in 62% of cases. Triggers are dominated by infectious causes and treatment discontinuation. Treatment consisted of adequate rehydration combined with insulin therapy according to the protocol. The average time to resolve ketoacidosis was de23.25heures. The hospital stay averages 12 days, with extremes ranging from 3 to 24 days. The outcome was favorable in all cases outside of a death.
Commentary: Our study aims to highlight that the diagnosis of DKA should be started early and requires a well codified treatment. The importance of awareness and education of doctors, health personnel, families of diabetics and people on the signs of diabetes in children to reduce the frequency and severity of pediatric diabetic ketoacidosis.

P-184-132

Study of serum erythropoietin levels in type 1 diabetic children

M.H. Mahfouz[1], N. Haider[1], M.H. Mahfouz[1], & Ayaat
[1]*NIDE, Cairo, Egypt*

Background: It is known that patients with renal failure have normochromic normocytic anemia due to impaired endogenous erythropoietin (EPO) synthesis.
Aim: The aim of this work was to determine whether low serum erythropoietin (s-EPO) levels play a role in the pathogenesis of anemia in patients with Type 1 diabetes without overt nephropathy.
Methods: We included in the study 80 Type 1 diabetic children and 15 healthy cildren as a control group. Both groups were subjected to: Blood cell count, s-EPO, albumin to creatinin ratio in random urine sample, glycated HbA_{1c}, serum iron, serum ferritin, and total iron binding capacity. The presence of neuropathy and nephropathy were determined.
Results: About 77% of type 1 diabetic children had a reduced EPO response to anemia. There were statistically significant differences between serum levels of EPO between control & study groups. There were no significant correlations between Hb levels and EPO levels, while there were positive negative correlations between Hb levels & EPO levels in the healthy control group. There were negative positive correlations between EPO levels and microalbuminuria in type 1 diabetic children.
Conclusion: There was reduced EPO responsive to anemia in type 1 diabetic children that could be due to the presence of even, early, neuropathy and nephropathy. It could be recommended to do more trials on use of EPO for treatment of anemia in type 1 diabetic patients.

Poster Tour 1 - Diabetes and Obesity

P-543-133

Racial/ethnic differences in rates of comorbidities in youth with type 2 diabetes (T2D) in the TODAY study

N.H. White[1], L. El Ghormli[2], L. Pyle[2], K. Copeland[3], R. Weinstock[4] & J. Lynch[5]

[1]*Washington University, Department of Pediatrics, St Louis, USA;* [2]*George Washington University, Biostatistics Center, Rockville, USA;* [3]*University of Oklahoma Health Science Center, Department of Pediatrics, Oklahoma City, USA;* [4]*SUNY Upstate Medical University, Department of Medicine, Syracuse, USA;* [5]*University of Texas Health Science Center, Department of Pediatrics, San Antonio, USA*

Objectives: T2D has increased along with the epidemic of obesity and its prevalence is higher in Blacks, Hispanics, American Indians, and Pacific Islanders. Complications of T2D are related to duration and glycemic control, but little is known about racial/ethnic differences in comorbidities in youth-onset T2D. The TODAY Study provides prospective data regarding rates of hypertension (HTN), microalbuminuria (MA), and dyslipidemia [↑LDL cholesterol (↑LDL) and ↑triglycerides (↑TG)] in a large multi-ethnic cohort of youth-onset T2D.
Methods: We examined rates of HTN, MA, ↑LDL, and ↑TG in TODAY Study subjects (n = 699), 10–17 years old with T2D for <2 years (mean 7.8 months) and a mean BMI z-score 2.15. The cohort was 5.9% American Indian (AI), 32.5% non-Hispanic Black (NHB), 39.8% Hispanic (H), 20.3% non-Hispanic White (NHW), and 1.5% non-Hispanic Asian (NHA). Over 2–6 years of follow-up, blood pressure was ascertained quarterly and MA and lipids annually, and managed by standardized protocol-specified regimens.
Results: The table shows rates of these comorbidities at baseline and new-onset during the study for the overall cohort and by race/ethnicity. Rates varied by race/ethnicity; AI and H had less initial HTN and NHB less initial (5.3%) and new-onset (4.8%) ↑TG. All groups had high rates of new-onset HTN (from 19.0% in NHW to 29.3% in AI). New-onset ↑LDL, ↑TG, and MA differed across race/ethnicity as well, with new-onset MA lowest (7.9%) in NHB and higher in NHA (18.2%) and H (12.2%). [Table 1]

Race/ Ethnicity	N (%)	Baseline				New-onset during study			
		HTN	↑LDL	↑TG	MA	HTN	↑LDL	↑TG	MA
Overall	699	11.6%	3.3%	18.2%	6.3%	22.2%	7.0%	10.0%	10.3%
AI	41 (5.9%)	4.9%	7.3%	22.0%	2.4%	29.3%	2.4%	7.3%	9.8%
NHB	227 (32.5%)	13.7%	4.0%	5.3%	6.6%	22.9%	9.7%	4.8%	7.9%
H	278 (39.8%)	7.9%	2.5%	25.9%	7.2%	21.9%	4.3%	11.2%	12.2%
NHW	142 (20.3%)	17.6%	2.8%	22.5%	5.6%	19.0%	9.2%	15.5%	9.9%
NHA	11 (1.5%)	9.1%	0.0%	18.2%	0.0%	27.3%	9.1%	27.3%	18.2%

Conclusions: Comorbidities are common and develop at differential rates across racial/ethnic groups during treatment of youth-onset T2D.

P-196-134

Effects of growth hormone and low protein diet on insulin resistance-related factors of adipose tissue in small-for-gestational-age model rats

T. Saito[1,2], K. Kobayashi[1], H. Yagasaki[1], Y. Mitsui[1], K. Nagamine[1], M. Mochizuki[1], K. Sato[1], T. Sano[1], K. Kobayashi[1], M. Ohta[1], K. Sugita[1] & K. Ohyama[1]

[1]*University of Yamanashi School of Medicine, Pediatrics, Yamanashi Prefecture Chu-oh City, Japan;* [2]*Yamanashi Prefectural Central Hospital, Pediatrics, Yamanashi Prefecture Kofu City, Japan*

Objectives: Born small for gestational age (SGA) individuals have risks for lifestyle-related diseases, and the effects of growth hormone (GH) treatment for these risks in SGA individuals with short stature are unclear. We aimed to investigate GH and dietary effects on markers for metabolic syndrome in SGA individuals.
Methods: We made SGA model rats by feeding low protein diet (LD) to pregnant Wister rats from the 10th gestational day. Dams continued to be fed LD during breastfeeding periods. After weaning SGA model rats were divided into LD, LD + recombinant rat GH (rrGH), normal diet (ND), and ND + rrGH, and were sacrificed at 50 days of age. The plasma levels of insulin-like growth factor-I (IGF-I) and glycoalbumin were measured. The expressions of GH receptor (*Ghr*), insulin-like growth factor-I (*Igf-I*), Igf binding protein-3 (*Igfbp-3*), Acid labile subunit (*Als*) and Igf binding protein-1 (*Igfbp-1*) in the liver and peroxisome proliferator-activated receptor gamma (*Pparγ*), CCAAT/enhancer-binding protein alpha (*C/Ebpα*), adiponectin and 11β hydroxysteroid dehydrogenase type 1 (*11βHsd1*) in adipose tissue were measured by real time PCR.
Results: Plasma IGF-I levels in the LD + rrGH group were lower than those in control. In liver rrGH did not increase *Igf-I*, *Igfbp-1&3*, and *Als* in LD + rrGH group, while rrGH increased *Ghr* in LD + rrGH. In adipose tissue LD affected *Pparγ*, adiponectin, *11βHsd1*, and *C/ebpα*. In the adipose tissue of all SGA model rats *Pparγ* levels decreased and *C/ebpα* increased. Only in ND + rrGH group rrGH increased *Pparγ* and decreased *C/ebpα*.
Conclusions: LD blunted rrGH effect and caused low plasma IGF-I level. The alterations of *Pparγ* and *C/ebpα* expression in adipose tissue may cause an increase of visceral fat mass and suggest future insulin resistance. GH administration can cause insulin resistance without a balanced diet.

P-276-135

Should we rely on HbA1c for the screening of T2DM?

G. Tornese[1,2], M.C. Pellegrin[1,2], C. Bertolini[1], E. Faleschini[1], O. Radillo[3], L. Monasta[4] & G. Tonini[1]

[1]*Institute of Maternal and Child Health IRCCS 'Burlo Garofolo', Department of Paediatrics, Trieste, Italy;* [2]*University of Trieste, Trieste, Italy;* [3]*Institute of Maternal and Child Health IRCCS 'Burlo Garofolo', Laboratory of Clinical Analysis, Trieste, Italy;* [4]*Institute of Maternal and Child Health IRCCS 'Burlo Garofolo', Epidemiology and Biostatistics Unit, Trieste, Italy*

Objectives: In 2011 both American Diabetes Association (ADA) and World Health Organization (WHO) included among the diagnostic criteria of diabetes mellitus an HbA1c ≥6.5% or ≥48 mmol/mol according to the new metric standardized IFCC, while HbA1c levels of 5.7–6.4% (39–47 mmol/mol) would indicate the presence of intermediate hyperglycaemia responsible for an increased risk of diabetes. The HbA1c could therefore theoretically replace the OGTT as a screening test in children at risk for T2DM. Aim of this study was to verify the predictive value of HbA1c towards the OGTT.
Methods: Evaluation of HbA1c and glycaemia and insulin during an OGTT in patients evaluated for overweight/obesity and for treatment with rhGH in a Paediatric Endocrinology Outpatient Care.
Results: Data were collected from 203 patients (114 males; 140 evaluated for overweight/obesity) with mean age 11.30 years (SD 3.41; range 2.70–17.88). The median HbA1c was 36 mmol/mol (IQR 6, range 16–46). Main results are shown in Table.
Logistic analysis revealed no relation between HbA1c and IFG nor IGT. On the contrary, we found that a borderline HbA1c is associated to insulin resistance (insulinaemia at 120′ ≥75 mUI/

ml) both in the bivariate logistic (P < 0.001, OR 3.6, 95% CI 1.81–7.33) and in multivariate logistic analysis (P < 0.001, OR 4.65, 95% CI 2.14–10.13).
Conclusions: These preliminary data show no relation between HbA1c and results of OGTT, therefore we believe HbA1c is not a reliable tool to detect T2DM or pre-diabetic status, at least in the paediatric population. However, we found a relation with insulin resistance which will need to be further investigated.
Table: Main results.

HbA1c (mmol/mol)	Normal (<39)	Borderline (39–47)	Diabetes (≥48)
	149 (73.9%) - *8 IGT - 4 IFG*	54 (26.1%) - *1 diabetic - 3 IGT - 0 IFG*	0
Fasting glucose (mg/dl)	Normal (<100)	Borderline (100–125)	Diabetes (≥126))
	199 (98%) - *50 borderline HbA1c*	4 (2%) - *0 borderline HbA1c*	0
Glucose at 120′ during OGTT (mg/dl)	Normal (<140)	Borderline (140–199)	Diabetes (≥200))
	191 (94,1%) - *53 borderline HbA1c*	11 (5,4%) - *3 bordeline HbA1c*	1 (0,5%) - *1 borderline HbA1c*

P-159-136
Profile of type 1 and type 2 diabetes in Saudi children and adolescents

R. Braham[1], A. Alzaid[1], M. Zitouni[2], M. Mujammami[1], S. Sobki[2] & F. Al Sabaan[1]
[1]*Armed Forces Hospital, Endocrinology and Diabetes, Riyadh, Saudi Arabia;* [2]*Armed Forces Hospital, Pathology, Riyadh, Saudi Arabia*

Objective: Prevalence of type 2 diabetes in children and adolescents is increasing worldwide. It is important to diagnose type 2 diabetes in children and adolescents as management challenges are different from those seen in adults with type 2 diabetes or children with type 1 diabetes. The objective of this study was to examine the clinical and biological parameters as a means to distinguish between type 1 and type 2 diabetes in Saudi children and adolescents.
Methods: Retrospective Descriptive survey (2009–2011).
Participants: A total of 219 patients (age ≤20 years) were admitted to hospital with new onset diabetes over two-year study period.
Data: Clinical, laboratory and immunological data were examined.
Results: There was slight preponderance of male gender (57% vs 43%). Family history of diabetes was present in 62% of patients. Body mass index (BMI) was normal, overweight and obese in 32%, 48% and 20% of patients respectively. Diabetic ketoacidosis (DKA) was initial presentation in 54% of study patients. Mean HbA1c at diagnosis was 10.4% (7.8–12%). Anti GAD autoantibodies (Ab) were positive in 47% of the patients while 32% patients showed positivity for two or more autoantibodies (anti GAD, anti IA2 and anti ICA). When patients were divided into 2 groups based on autoantibody status, Ab+ patients had higher rate of DKA (89% vs 22%, P < 0.001), lower BMI (21 vs 28.5 Kg/m^2, P = 0.04), lower HbA1c (8.2% vs 10.7%, P = 0.001) and higher frequency of low basal C-peptide concentrations (78% vs 7%, P < 0.001) than Ab- patients. The two groups however, did not differ with regards to age at diagnosis, gender or presence of family history of diabetes.
Conclusion: Type 2 diabetes in Saudi children and adolescents is marked at presentation by absence of DKA, high BMI, excessively elevated HbA1c and normal basal C-peptide concentration.

P-269-137
Resolution of diabetes after bariatric surgery in three severe obese adolescents: a preliminary experience with a multidisciplinary approach

P. Iaccarino Idelson[1], E. Zito[1], E. Mozzillo[1], F. Alicchio[1], C. Cerrato[1], C. Esposito[1] & A. Franzese[1]
[1]*University of Naples Federico II, Pediatrics, Naples, Italy*

Objectives: Severe obese adolescents (SOA) are at risk of comorbidities (diabetes, hypertension, cardiovascular diseases, steatohepatitis and dyslipidemia) and of psychosocial correlates (low self-esteem, obesity stigma, reduced quality of life). Multidisciplinary interventions are necessary to reverse this trend. We report our multidisciplinary approach to bariatric surgery (BS) in SOA, affected by diabetes, who achieved no results by conventional treatment previously performed.
Methods: In 12 months, 3 patients were selected for BS from our severe obese in-patient clinic (n = 50). The inclusion criteria were: comorbidities, failure of conventional treatment, high motivation to surgery and psychosocial correlates. Patients were evaluated pre-surgically by a multidisciplinary team (pediatrician, nutritionist, psychologist and pediatric surgeon) and underwent to a Bioenteric Intragastric Balloon positioning. All the patients were affected by diabetes, their average age was 16.3 years old (range 15.4–18.0) and their BMI was higher than 40 kg/m^2. After surgery the multidisciplinary team followed them monthly.
Results: After 12 months diabetes was resolved in all patients; weight was reduced of 37.9, 30 and 32 kg respectively; BMI decreased of 15.6, 11.3 and 14.6 kg/m^2 respectively. Moreover, some psychosocial correlates improved (self-esteem, social relationships and quality of life). No side effects were detected during the follow up.
Conclusions: This study suggests that bariatric surgery could be an effective treatment to resolve diabetes and other comorbidities in SOA, since recruitment has to be very selective according to multidisciplinary criteria, and the follow up has to be managed by a multidisciplinary team. More long-term and larger sample studies are necessary in order to confirm the surgery effectiveness on the resolution of comorbidities in SOA.

Table: Characteristics of the patients.

Patient	Sex	Age	Comorbidities	Surgical procedure	Weight loss (kg)	BMI (kg/m^2) before surgery	BMI (kg/m^2) post surgery	Δ BMI (kg/m^2)
1	M	15.4	Diabetes, steatohepatitis, hypertension, arms and legs necrobiosis, asthma	BIB	37.9	54.7	39.1	15.6
2	F	18.0	Diabetes, steatohepatitis, hypertension	BIB	30.0	45.2	33.9	11.3
3	M	15.5	Diabetes, Hypertension, sleep apnea, severe scholiosis	BIB	32.0	53.4	38.8	14.6

P-305-138

The relation of serum nesfatin-1 level with metabolic and clinical parameters in obese and healthy children

A. Abaci[1], G. Catli[1], A. Anik[1], T. Kume[2] & E. Bober[1]
[1]*Dokuz Eylul University Medical Faculty, Pediatric Endocrinology, Izmir, Turkey;* [2]*Dokuz Eylul University Medical Faculty, Department of Medical Biochemistry, Izmir, Turkey*

Background: Nesfatin-1 is a recently discovered anorexigenic neuropeptide, expressed in several tissues including pancreatic islet cells, neurons of forebrain, hindbrain, brainstem and spinal cord. It seems to play an important role in hypothalamic pathways regulating food intake and energy homeostasis.
Objective: To investigate the association between serum nesfatin-1 levels and metabolic parameters in obese children.
Methods: The study included 37 obese children with a body mass index (BMI) >95th percentile and 31 healthy children with a BMI <85th percentile. Fasting serum glucose, insulin, lipid profile, and nesfatin-1 levels were measured to evaluate the metabolic parameters.
Results: Obese group had significantly higher BMI, BMI-SDS, triglyceride, insulin, and homeostasis model assessment index-insulin resistance, systolic and diastolic blood pressure than the control group ($P < 0.05$). However, total cholesterol (C), HDL-C and LDL-C levels were not different between the groups ($P > 0.05$). Serum nesfatin-1 level of the obese group was significantly lower than the control group (1.5 ± 1.6 vs 2.7 ± 1.0, $P = 0.001$, respectively). When we compared nesfatin-1 levels among obese patients regarding the existence of insulin resistance there was not significant difference between groups (0.7 ± 0.7 vs 1.7 ± 1.7, $P = 0.202$, respectively). In the obese group, nesfatin-1 level was negatively correlated with BMI-SDS while, it was not correlated with insulin resistance index ($r = -0.490$, $P = 0.02$ vs $r = -0.155$, $P = 0.361$, respectively).
Conclusions: This is the first study to evaluate the nesfatin-1 level in relation with anthropometric and metabolic parameters in obese children. We found that nesfatin-1 levels were significantly lower in the obese group than the control group. According to the results of this study, we emphasize that nesfatin-1 may play an important role in regulation of food intake in obese individuals.
Keywords: Childhood obesity, nesfatin-1, insulin resistance.

P-522-139

Type 2 diabetes in Peruvian children: a case series

M. Pinto[1,2] & H. Manrique[3,4]
[1]*Cayetano Heredia Hospital, Endocrine Service, Lima, Peru;* [2]*Cayetano Heredia Hospital, School of Medicine, Lima, Peru;* [3]*Arzobispo Loayza Hospital, Endocrine Service, Lima, Peru;* [4]*Obesity and Nutrition Research Center, Diabetes, Lima, Peru*

Objective: To describe 32 cases of children with type 2 diabetes (T2D) in two general hospitals in Lima, Peru.
Methods: In this retrospective study, we reviewed 32 clinical records of children with diagnosis of T2D between January 2009 and December 2011; and extracted clinical and laboratory data at presentation.
Results: During this period, 32 children (19 girls, mean age 14.3 years, 68% at Tanner stages of IV and V) were diagnosed with T2D. At presentation, the mean BMI was 32.8 Kg/m^2, 85% had acanthosis nigricans, 43% had family history of T2D, and 17% presented with diabetic ketoacidosis (DKA). The initial mean glucose was 380 mg/dl (SD 166), HbA1c was 11.7% (SD 2.7), and c-peptide was 2.8 ng/dl (IQR 1.5–3.4). Initial treatment included metformin in 64.3% and insulin in 41%. It was usual to combine metformin with insulin (25%) and sulfonylurea (7%). There was no relationship among age, sex, disease duration, BMI, HbA1c, and c-peptide with long-term use of insulin or DKA at presentation.
Conclusion: T2D has traditionally been viewed as a disorder of adults. However, as the prevalence of obesity in youth is increasing, T2D is now occurring in children and adolescents. This problem falls disproportionately on African and Hispanic children. Currently, Peru is passing through its epidemiological transition, were infectious disease are coexisting with chronic diseases like obesity, diabetes, and cardiovascular diseases. In the long-term, these children have higher risk of developing complications at early ages.

P-520-140

Assessment of visceral fat in patients with childhood-onset non-obese type 2 diabetes

T. Urakami[1], R. Kuwabara[1], M. Habu[1], M. Okuno[1], J. Suzuki[1], A. Yosida[1], S. Takahashi[1] & H. Mugishima[1]
[1]*Nihon University School of Medicice, Pediatrics, Tokyo, Japan*

Objective: In Japan, we have higher prevalence of children with non-obese type 2 diabetes (T2D) than Caucasians. They may have a large amount of visceral fat (VF) as compared with subcutaneous fat (SF), which could be the strong risk factor for developing T2D associated with insulin resistance. We examined the VF, SF and indices for insulin resistance in patients with childhood-onset non-obese T2D and compared the findings to those of obese T2D patients.
Methods: Seven patients, one male and six females, with non-obese T2D with BMI <25 were assessed for waist circumference (WC), total body fat (TBF), SF and VF areas on abdominal CT, and HOMA-IR. These data were then compared to those of eight obese patients, two males and six females, with BMI ≥25.
Results: The average values of WC, TBF, VF areas and HOMA-IR in non-obese patients were 73.9 ± 6.7 cm, 167.0 ± 70.0 cm^2, 53.4 ± 32.2 cm^2 and 4.4 ± 2.1 respectively. Those in obese patients were 95.0 ± 7.3 cm, 415.7 ± 84.3 cm^2, 98.2 ± 33.1 cm^2 and 9.8 ± 3.3 respectively. All these values were significantly higher in obese T2D patients. Besides, of the seven patients with non-obese T2D, two had WC ≥80 cm, three had a VF area ≥60 cm^2 and four showed HOMA-IR ≥3.0. On the other hand, there was no significant difference of VF/SF ratio between the two patient's groups, however, the majority (7 out of 8) of the non-obese patients had VF/SF ≥0.3, whereas only 3 out of the 8 obese patients showed VF/SF ≥0.3.
Conclusions: Patients with non-obese T2D had a large amount of VF as compared with SF, which might be a major cause of T2D associated with insulin resistance.

P-270-149

Metabolic monitoring of obese children born small for gestational age

R.F. Stroescu[1,2], I. Micle[1,2], M. Marazan[1,2] & T. Bizerea[2]
[1]*Emergency Children Hospital 'Louis Turcanu', Pediatrics, Timisoara, Romania;* [2]*University of Medicine and Pharmacology 'v. Babes', Timisoara, Romania*

The ''catch-up growth'' phenomenon in children born small for gestational age (SGA) has been linked to early onset obesity with the subsequent emergence of metabolic syndrome (metS) or its components. It has been postulated that the prevalence of the MetS and its components increases strongly with age. The aim of the study is to establish whether SGA constitutes an additional risk factor in the development of the MetS and to investigate the interdependence between MetS and age.
Material and methods: A retrospective study was carried out over a 4 year period (2007–2010) on long-term metabolic complications in obese children born appropriate for

gestational age (AGA) and SGA. 517 patients were divided in two groups taking birth weight/length correlated with gestational age into account: SGA (107 patients- 20%) and AGA (410 patients-80%). Each group was divided in three subgroups by age: prepubertary group, pubertary group and adolescents. Blood pressure, lipid and glucose were determined. Oral glucose tolerance tests were performed in all subjects.
Results: Prepubertary patients showed no significant differences between SGA and AGA; 4.8% met the framing criteria (according to Weiss) for the MetS. Quarter from each group had developed one component of the MetS besides obesity. Pubertary patients showed a slightly increased prevalence of the MetS amoung SGA patients 19.8%, compared to AGA patients 7.3% (P = 0.034). One component in addition to obesity was developed in approximately 35% patients in both groups. The MetS prevalence was significantly higher in obese adolescents born SGA 36.8% compared to AGA 15.7% (P = 0.032). One component associated with obesity was reported in 30.5% AGA and 31.5% SGA patients.
Conclusion: MetS and its components developed progressively with age. Increased prevalence of the MetS in SGA patients indicates that being born SGA appears to be an additional risk factor in the developement of the MetS starting with puberty.

P-337-150
Prevalence of overweight and obesity in children and adolescents with T1DM: a 10-year audit

E.C. Matthews[1], H. Gilbertson[2] & F.J. Cameron[1]
[1]*Royal Children's Hospital, Endocrinology & Diabetes, Melbourne, Australia;* [2]*Royal Children's Hospital, Nutrition and Food Services, Melbourne, Australia*

Objectives: To determine the prevalence of overweight and obesity in children and adolescents with T1DM attending diabetes clinic at the Royal Children's Hospital (RCH), Melbourne and to compare this information to the general age-matched Australian population.
Methods: A cross sectional audit was performed using the Diabetes database to include all children and adolescents with T1DM aged between 2 and 18 years of age who attended RCH over a 10 year period. A total of 9326 records of anthropometric data were collected and converted to z-scores (using 2000 CDC growth data). Comparative data was sourced from the 2007 Australian National Children's Nutrition and Physical Activity Survey and the National Secondary Student's Diet and Activity (NaSSDA) survey 2009–2010. Growth cut-offs (BMI z-score) were used as defined by the World Health Organisation.
Results: Prevalence of overweight and obesity in the diabetes clinic population showed small variation over the 10 years, but no noticeable trend. Current rates of overweight for the clinic population are 38% and 20% of females and males respectively and obesity rates are 4–5% in females and 8% in males. In comparison to national data, our results showed an increased prevalence of overweight status across all ages and gender (up to twofold) but no increase in the prevalence of obesity.
Conclusions: This data demonstrates an increase, across all age groups, in the prevalence of overweight, not obesity, in our population of children and adolescents with diabetes compared to the national data. This information will be used to tailor dietary education and clinical management and also inform future research.

P-69-151
Effect of statins on inflammation and coagulation in obese children

M. Dirlewanger[1], C. Combescure[2] & V.M. Schwitzgebel[1]
[1]*Children's University Hospital, Pediatric Endocrine and Diabetes Unit, Geneva, Switzerland;* [2]*Geneva University Hospital, Epidemiology Division, Geneva, Switzerland*

Objectives: Increased inflammatory cytokines, C-reactive protein (CRP) and prothrombotic parameters have been identified as potential markers of cardiovascular risks in obesity. Statins have been shown to reduce CRP and positively modulate inflammation and lipid levels. The aim of our study was to investigate if statins can reverse the inflammatory and prothrombotic states.
Methods: We conducted a randomized controlled double-blind study with 30 obese patients aged 12–16 years at the Children's University Hospital of Geneva. The two groups were assigned to receive placebo (Group1) or Atorvastatin (0.2–0.3 mg/kg/d, max 20 mg) (Group2) for 4 months. Interleukin-6 (IL-6), Interleukin-10 (IL-10), Interferon-g-inducible Protein (IP10), Monocyte Chemoattractant Protein 1 (MCP-1), Interleukin-1 Receptor antagonist (IL-1Ra) as well as CRP were measured. Hypercoagulability was evaluated by measuring prothrombin time (PT), activated partial thromboplastin time (aPTT), endogenous thrombin potential (ETP), Fibrinogen and D-dimers. Fasting Glucose, Insulin were also determined and insulin resistance was assessed by the homeostatic model (HOMA). All parameters were collected at baseline (Visit1) and after 4 months (Visit2).
Results: The two groups showed similar clinical characteristics at baseline; median age was 13.2 vs 14.2 years, BMI (kg/m^2) 31.7 vs 32.4. After 4 months MCP-1 and AUC of ETP decreased in group2 (median 172.2 Visit1 vs 141.6 pg/ml Visit2 and 396.9 vs 384.9) but did not reach significance (P = 0.09 and P = 0.07 respectively). Statins showed no decrease of insulino-resistance or of the other markers.
Conclusion: The intervention with statins tended to lower the pro-inflammatory MCP-1 levels and ETP. MCP-1 was already shown to be the most increased in obese children compared to lean ones and in vitro studies showed a dose-dependent inhibition of MCP-1 production by statins. Therefore MCP-1 could be an indicator for the development of atherosclerotic lesions.

P-292-152
Obesity has an independent adverse effect on the glycaemic control of children with type 1 diabetes

S. Ahmed[1], S. D'Costa[1], A. Gupta[1] & M. Ismail[2]
[1]*Darent Valley Hospital, Paediatrics, Dartford, UK;* [2]*Darent Valley Hospital, Department of Diabetes, Dartford, UK*

Objective: To investigate the relationship between Obesity and Glycaemic control in Type 1 Diabetes in a District General Hospital setting.
Method: A cross-sectional study of 184 children aged 0–21 years constituting 86 girls (46.7%) and 98 boys (53.3%), who attended the Joint Diabetes clinic our hospital over the preceding five years (from 1/1/07 to 25/5/12). The data was retrieved using a Computerised Diabetes Database - 'Diabeta 3'. Body mass index (BMI) was used as a measure of obesity and HbA1c was used as a measure of Glycaemic control.
Results: Glycaemic control was adversely affected by increase in weight in both sexes. When BMI was below 20, HbA1c was greater than 8% (64 mmol/mol) in 67.2% of the patients. When the BMI was between 20–25, HbA1c was greater than 8% in

75.3% of the patients, and when BMI was between 25–30, HbA1c was greater than 8% in 81.8% of the patients. The majority of our patients were on an intensive regime which comprises either a basal bolus or insulin pump. At BMI <20, 58.2% were on an intensive regime, BMI 20–25, 68.3% were on an intensive regime and between 25–30, 77.3% were on an intensive regime. Intensive regimes might have liberalised intake and this is reflected in a steady increase in BMI. There were too few patients above BMI 30 to enable valid data interpretation.
Conclusion: Glycaemic control (HbA1c) worsens with obesity (increasing BMI) in both sexes. Obesity seems to be an independent factor in glycaemic control.

Table: Effect of BMI on HbA1c.

BMI (Kg/m^2)	Percentage of children with HbA1c >8%	Percentage of children on Conventional insulin regime	Percentage of children on Intensive insulin regime
<20	67.2%	41.8%	58.2%
20–25	75.3%	31.8%	68.3%
25–30	81.8%	22.7%	77.3%
30–35	60%	28.6%	71.4%
>35	33.3%	100%	0%

P-409-153

How effective are physical activity intervention programmes in children? Systematic review and meta-analysis of controlled trials with objectively-measured outcomes

B. Metcalf[1], W. Henley[2] & T. Wilkin[1]
[1]*Peninsula College of Medicine and Dentistry, Endocrinology and Metabolism, Plymouth, UK;* [2]*Peninsula College of Medicine and Dentistry, Peninsula Collaboration for Leadership in Applied Health Research and Care (PenCLAHRC), Exeter, UK*

Objectives: Physical activity (PA) is deemed to be an important factor in the prevention of obesity and diabetes in children. PA programmes are intuitively assumed to increase PA, but what is the evidence?
Methods: Electronic databases (EMBASE, MEDLINE, PsycINFO, SPORTDiscus) and the reference lists of relevant articles were searched for studies that aimed to increase the PA of children. Importantly, only studies that measured whole-day PA objectively with accelerometers were eligible (questionnaire data are known to bias the intervention group), and only randomised controlled trials or controlled clinical trials (cluster and individual) lasting more than four weeks were included. Intervention effects (standardised mean differences - SMD) were calculated for total PA (TPA) and/or for time spent in moderate-and-vigorous PA (MVPA) for each study, and pooled using a weighted random-effects model. Meta-regression explored the heterogeneity of intervention effects in relation to study participants, design, intervention type and methodological quality.
Results: Thirty studies (involving 14326 participants) met the criteria, and all were eligible for meta-analysis/regression. The pooled intervention effect across all studies was small-to-negligible for TPA (0.11 SMD, 95%CI: 0.03–0.18, P < 0.01) and small for MVPA (0.16 SMD, 95%CI: 0.07–0.24, P < 0.001). Meta-regression indicated that the pooled intervention effect did not differ significantly between any of the sub-groups (ie. for TPA - Age: <10 years = 0.07 SMD, >10 years = 0.16 SMD, P = 0.19. BMI: entire range = 0.08 SMD, exclusively overweight/obese = 0.22 SMD, P = 0.07. Duration: ≤6 months = 0.12 SMD, >6 months = 0.09 SMD, P = 0.71. Type: with PA sessions = 0.07 SMD, without PA sessions = 0.14 SMD, P = 0.26. Quality: higher = 0.11 SMD, lower = 0.08 SMD, P = 0.64).
Conclusions: The literature suggests that PA interventions have little impact on children's activity, which may explain their limited success in reducing childhood obesity.

P-496-154

One in five overweight/obese adolescents in the community has metabolic syndrome

M.Y. Jalaludin[1], A.F. Abang Abdullah[1], N. Saiman[1], N. Samingan[1], Z. Mohamed[2] & F. Harun[1]
[1]*Faculty of Medicine, University Malaya, Department of Paediatrics, Kuala Lumpur, Malaysia;* [2]*Faculty of Medicine, University Malaya, Department of Pharmacology, Kuala Lumpur, Malaysia*

Introduction: Childhood obesity is on the rise globally, and Malaysia is of no exception. The major concern of childhood obesity is that it is highly associated with metabolic syndrome which predispose an early risk of cardiovascular disease and type 2 diabetes mellitus.
Objective: To determine the rate of metabolic syndrome in overweight/obese adolescents in the community.
Methodology: Overweight (OW) and obese (OB) adolescents who have never seek medical attention, were identified from schools in a local township and invited to attend a one-day obesity workshop. Anthropometric and waist measurements, together with fasting bloods were taken. Metabolic syndrome was defined using International Diabetes Federation (IDF) 2007 Guidelines i.e presence of abdominal adiposity (WC >90th centile for age and gender) plus two/more clinical features (i.e high fasting plasma glucose (FPG >5.6 mmol/l), hypertension (BP >130/85 mmHg), elevated triglyceride (TG >1.7 mmol/l) and low HDL-cholesterol (<1.03 mmol/l).
Results: A total of 172 adolescents (19.7% OW, 80.3% OB) attended the workshop; with 96 (55.8%) were males and mean age 14.2 years (ranges 12–17 years). Abnormal WC was documented in 157 (91.3%); 18 (10.4%) had high FPG and 61 (35.5%) had hypertension. Nineteen (11.0%) had high TG while 43 (25.0%) had low HDL. Thirty three (19.2%) fulfilled metabolic syndrome criteria (30.7% were OW, 59.3% were OB).
Conclusion: The prevalence of metabolic syndrome among the overweight/obese adolescents in this community was high. Routine screening by the school health authority is highly recommended to help reduce the risk of complications.

P-284-155

Plasma chemerin levels in children and adolescents with type 1 diabetes mellitus compared to healthy controls

J. Hoentzsch[1], H. Jasser-Nitsche[1], S. Ueberschaar[1], E. Suppan[1], G. Weinhandl[1], R. Riedl[2], R. Aigner[3], M. Borkenstein[1] & E. Froehlich-Reiterer[1]
[1]*Medical University of Graz, Department of Pediatrics, Graz, Austria;* [2]*Medical University of Graz, Institute for Medical Informatics, Statistics and Documentation, Graz, Austria;* [3]*Medical University of Graz, Department of Nuclear Medicine, Graz, Austria*

Objectives: Chemerin is a very recently discovered adipokine which seems to play an important role in adipocyte differentiation and insulin signaling. Type 1 diabetes mellitus (T1DM) is considered as a proinflammatory condition and adipose tissue involvement seems evident. The aim of our study was to investigate plasma chemerin levels in children and adolescents with T1DM and to compare them to healthy controls (HC). Furthermore, we analyzed the relationship between plasma chemerin levels and glycemic control (HbA1c), fasting

blood glucose, mean insulin dosage, duration of diabetes, body mass index (BMI), pubertal status and lipid profile in the T1DM-group.

Methods: We investigated 124 subjects; 62 patients with T1DM (31 girls, mean age 14.2 ± 3.7 years; mean duration of diabetes 5.9 ± 3.5 years; mean insulin dosage 0.9 ± 0.3 U/kg/d) and 62 healthy controls (17 girls, mean age 11.5 ± 4.7 years). The mean BMI was 20.18 ± 3.22 in the T1DM group and 18.44 ± 4.25 in the HC-group.

Results: The mean plasma level of chemerin was significantly lower in children and adolescents with T1DM (141.1 ± 24.5 ng/ml) compared to healthy controls (165.8 ± 33.5 ng/ml) ($P < 0.001$). After adjustment for gender, BMI and pubertal status, the mean chemerin level remained significantly lower in the T1DM-group (143.5 vs 169.7 ng/dl, $P < 0.001$). In the T1DM-group, chemerin levels correlated inversely with fasting glucose ($r = -0.39$; $P = 0.002$) and mean insulin dosage ($r = -0.26$; $P = 0.046$), adjusted for gender, BMI and pubertal status respectively. There were no significant correlations to HbA1c, duration of diabetes, BMI, high density lipoprotein (HDL), total cholesterol, low density lipoprotein (LDL) cholesterol and triglycerides.

Conclusions: Children and adolescents with T1DM have lower plasma chemerin levels compared to HC. Plasma chemerin levels are correlated to fasting glucose and mean insulin dosage inversely. These findings suggest that chemerin might be involved in glucose metabolism.

P-347-156

Induction mechanism of lipocalin-2 expression by co-stimulation with interleukin-1β and interferon-γ in RINm5F beta-cells

S.-Y. Chang[1], D.-B. Kim[2], Y.-H. Jo[1] & M.-J. Kim[1]

[1]*The Catholic University of Korea, Department of Physiology, Seoul, Korea, Republic of;* [2]*The Catholic University of Korea, Department of Internal Medicine, Seoul, Korea, Republic of*

Objectives: Lipocalin-2 (LCN-2) is known to act as an antiinflammatory or a proinflammatory mediator depending on cell types. Recently, LCN-2 has been recognized as an adipokine that links obesity and insulin resistance. However, there is no knowledge about the expression mechanism and the role of LCN-2 in pancreatic islet β-cells. Therefore, we examined molecular mechanisms by which proinflammatory cytokines interleukin-1β (IL-1β) and interferon-γ (IFN-γ) induce LCN-2 expression in RINm5F β-cells.

Methods: RINm5F cells were treated with IL-1β and/or INF-γ. LCN-2 protein and mRNA expressions were examined by Western blot and Northern blot analyses. Transient transfection and luciferase reporter assay was performed to examine the LCN-2 promoter activity. Electrophoretic mobility shift assay (EMSA) was performed to examine the binding of NF-κB to promoter sites of LCN-2. In addition, iNOS and COX-2 expressions were examined by RT-PCR.

Results: Unlike IL-1β, INF-γ alone did not induce LCN-2 mRNA and protein expression, however, IFN-γ significantly potentiated IL-1β-induced LCN-2 mRNA and protein expression. Meanwhile, INF-γ did not potentiate IL-1β-induced LCN-2 promoter activity, and promoter study using serially deletion constructs showed that NF-κB binding site was a key transcription factor in LCN-2 promoter activity. Also, INF-γ did not potentiate IL-1β-induced the band intensity of DNA-protein complex on NF-κB binding site of LCN-2 promoter. In addition, we found that LCN-2 expression was significantly increased compared with both iNOS and COX-2 under exposure to IL-1β, and that LCN-2 receptor was expressed in islet β-cells RINm5F and INS-1 cells.

Conclusions: These findings suggest that IFN-γ significantly potentiated IL-1β-induced LCN-2 expression at mRNA and protein level but not at promoter level, and NF-κB binding site was a key factor in IL-1β-induced LCN-2 expression at transcriptional level.

Poster Tour 2 - Diabetes and Obesity

P-154-141

Beneficial effects of cholecalciferol (25-OH vitamin D3) in Indian obese children (9–15 years) and its relationship to insulin resistance leading to type 2 diabetes

M. Jain[1,2], P. Kumar[3], A. Chowdhry[4] & D. Bhalla[5]
[1]*Aayyuskaam Diabetic Foundaation, Holistic Health, New Delhi, India;* [2]*Aaayyuskaam Holistic Clinic, New Delhi, India;* [3]*Jawaharlal Nehru University, School of Life Sciences, New Delhi, India;* [4]*Dr. B. R. Sur Homoeopathic Medical College Hospital and Research Centre, New Delhi, India;* [5]*Aayyuskaam Diabetic Foundaation, New Delhi, India*

Objectives: The aim of the study was to compare the prevalence of cholecalciferol (25-OH Vitamin D3) deficiency in Indian obese children in southern part of New Delhi. To examine relationships between low cholecalciferol level in blood and markers of insulin resistance. To examine the changes in the markers of insulin resistance after increasing dietary sources rich in natural cholecalciferol.
Methods: Using a cross-sectional design, serum cholecalciferol, fasting glucose & insulin, glucose tolerance test (GTT), glycosylated hemoglobin (HbA1c) and homeostasis model assessment of insulin resistance were recorded for 75 obese children (subject) between 9–15 years old at Aayyuskaam Holistic Clinic, New Delhi, India. Increasing natural dietary sources rich in cholecalciferol like cheese, fortified milk, fish, cereals, butter and open air physical activities (exposure to sun light) for 3–6 months.
Results: Eighty two (82%) percent of obese subjects had a cholecalciferol level below 30 ng/ml and eighteen (18%) were below 20 ng/ml (both $P < 0.01$). Cholecalciferol was positively correlated with homeostasis model assessment of insulin resistance ($P = 0.01$) and GTT ($P = 0.05$). Positive results of dietary and life-style changes were observed in all subjects with decrease in obesity-BMI and shift in serum indices toward preferred ranges for cholecalciferol, fasting glucose & insulin, GTT and HbA1c.
Conclusions: Cholecalciferol [Vitamin D] deficiency is common in Indian obese children in this southern part of New Delhi. Lower Cholecalciferol level is associated with increase risk factors for type 2 diabetes. Healthy active life-style changes and balanced nutritional diet is essential to fight the diabetes epidemic. More data in children are needed, not only to understand better health implications of specific serum levels but also to determine the appropriate cholecalciferol supplement requirements for children.

P-288-142

Children and adolescents with T1DM have higher plasma visfatin levels than healthy controls

J. Hoentzsch[1], H. Jasser-Nitsche[1], S. Ueberschaar[1], E. Suppan[1], G. Weinhandl[1], R. Riedl[2], R. Aigner[3], M. Borkenstein[1] & E. Froehlich-Reiterer[1]
[1]*Medical University of Graz, Department of Pediatrics, Graz, Austria;* [2]*Medical University of Graz, Institute for Medical Informatics, Statistics and Documentation, Graz, Austria;* [3]*Medical University of Graz, Department of Nuclear Medicine, Graz, Austria*

Objectives: Visfatin is a novel adipokine which is predominantly secreted by visceral adipose tissue and seems to have insulin-mimetic effects. It has not been studied in children and adolescents with type 1 diabetes mellitus (T1DM) yet. Therefore, the aim of this study was to examine plasma visfatin levels in pediatric patients with T1DM and to compare them to healthy controls (HC).
Methods: We investigated 124 subjects; 62 patients with T1DM (31 girls; mean age 14.2 ± 3.7 years; mean duration of diabetes 5.9 ± 3.5 years; mean insulin dosage 0.9 ± 0.3 U/kg/d) and 62 HC (17 girls; mean age 11.5 ± 4.7 years). In the T1DM-group we analyzed the relationship between visfatin and glycemic control (HbA1c), fasting blood glucose, duration of diabetes, BMI (body mass index), pubertal status and lipid profile.
Results: The mean plasma level of visfatin was 17.5 ng/dl (range 10.6–104.5 ng/dl) in the T1DM-group and 16.4 ng/dl (range 9.5–83.8 ng/dl) in the HC-group. An unadjusted comparison between the groups showed a significant difference between visfatin levels ($P = 0.041$). After adjustment for gender, BMI and pubertal status, the adjusted mean serum visfatin level remained significantly higher in the T1DM-group (19.2 vs 16.3 ng/dl, $P = 0.040$). In the T1DM-group we did not find a correlation between visfatin levels and BMI, HbA1c, duration of diabetes, fasting blood glucose, pubertal status, total cholesterol, LDL cholesterol and triglycerides. We found a significant correlation between visfatin levels and HDL ($r = 0.39$, $P = 0.002$), also after adjustment of gender, BMI and pubertal status ($r = 0.37$, $P = 0.004$).
Conclusions: Children and adolescents with T1DM have higher plasma visfatin levels compared to HC. It is possible that visfatin influence glucose metabolism in T1DM. The release of visfatin might be involved in the regulation of glucose homeostasis, indicating an important role for visfatin in T1DM and meriting further consideration.

P-376-143

Trends of overweight and obesity in Polish adolescents: results of HBSC study

J. Mazur[1], J. Gajewski[1], I. Tabak[1] & A. Dzielska[1]
[1]*Institute of Mother and Child, Warsaw, Poland*

Objectives: Evaluation of changes in the prevalence of overweight and obesity in adolescents aged 11–15 years in 2002–2010 in connection with lifestyle changes.
Methods: Data were taken from the Health Behavior in School-aged Children (HBSC) study. Students were measured and weighed a week before filling out the questionnaire. IOTF (International Obesity Task Force) criteria of being overweight and obese were used for the analysis. Data from the Polish sample (2002-6383, 2006-5489, 2010-4571) was compared with data from the combined sample of 30 countries (an average of 1 35 000 participants in each edition of the study). Due to examine the impact of lifestyle on body mass changes patterns of physical activity were defined using data on time spent watching TV and computer games, and total physical activity index (range 0–15 points).
Results: The proportion of adolescents who were overweight or obese increased in 2002–2010 from 8.5% to 18.1%. This was a much bigger increase than in the international sample (from 12.4% to 15.7%). Particularly high growth was observed in Poland between 2006–2010, after the accession to the EU. The problem was more pronounced in the younger age groups. The increase in overweight and obesity is accompanied by lifestyle changes: spending more time at the computer and the decrease of time spend on vigorous physical activity and after-school activities. In the most favorable pattern of physical activity no

increase in the level of overweight or obesity was observed during the study period.
Conclusions: International comparisons on the prevalence of excess body weight in adolescents indicate that the position of Polish adolescents is going down in these rankings. Lifestyle changes may be partly responsible for the growing epidemic of excess body weight in Poland, which in turn may increase the risk of metabolic diseases in this generation.

P-451-144

Vitamin D is not associated with insulin sensitivity measured by IVGTT in obese and normal weight adolescents

M. Sunni[1], B. Frohnert[1], A.S. Kelly[1], W. Thomas[1], B. Nathan[1] & L.E. Polgreen[1]
[1]*The University of Minnesota, Pediatrics, Minneapolis, USA*

Objectives: Vitamin D has been positively associated with insulin sensitivity in adults. Studies evaluating this relationship in children have been limited by the use surrogate measures of insulin sensitivity rather than direct measures, such as frequently sampled IV glucose tolerance testing (IVGTT). Therefore, the aim of this study was to assess the association of 25-hydroxy vitamin D (25OHD) with insulin sensitivity measured by IVGTT in adolescents throughout a range of body mass index (BMI).
Methods: Obese and normal weight adolescents, aged 9–17 years, underwent an IVGTT to measure insulin sensitivity (Si). Percent body fat was measured by dual-energy x-ray absorptiometry. Serum 25OHD levels were measured by liquid chromatography mass spectrometry. Si, HOMA-IR and fasting insulin were regressed separately on 25OHD with adjustors, Tanner stage, and gender (model 1) and Tanner stage, gender, and percent body fat (model 2).
Results: Forty-seven participants (53% female) with BMI SDS range -1.5 to 2.8 were enrolled. Associations of Si, HOMA-IR and fasting insulin with 25OHD are shown in the table below:
Conclusions: Using IVGTT, 25OHD was not associated with insulin sensitivity in adolescents independent of adiposity. Therefore, previously reported associations of vitamin D with HOMA-IR and/or fasting insulin may have been influenced by differences in adiposity rather than insulin sensitivity, per se.

Table: Associations of outcomes with 25OHD.

	25OHD regression Coefficient (model 1)	25OHD regression Coefficient (model 2)
Log (insulin sensitivity)	0.022 (P = 0.082)	0.001 (P = 0.911)
HOMA-IR	-0.094 (P = 0.008)	-0.034 (P = 0.185)
Fasting insulin	-0.389 (P = 0.013)	-0.120 (P = 0.277)

P-25-145

Waist-to-height ratio as simplified indicator of abdominal obesity and associated metabolic risk in urban children 7–13 years

Y. Vainilovich[1], L. Danilova[1] & M. Lushchyk[1]
[1]*Belarusian Medical Academy for Postgraduate Education, Endocrinology Department, Minsk, Belarus*

Objectives: To investigate prevalence of abdominal obesity (AO) diagnosed by waist-to-height (WHt) ratio and estimate metabolic risk associated with it in urban children aged 7–13 years.
Methods: First, anthropometric measurements were taken in 878 children (M/F = 427/451), mean age 10.78 ± 1.89 years (range 7–13 years) and mean body mass index (BMI) SDS 0.35 ± 1.18 [range -3.13 to 3.71]. Then, metabolic profile was analyzed in 79 children (M/F = 41/38), mean age 10.95 ± 1.09 years (range 9–13 years) and median BMI SDS 1.67[0.15; 2.43], (range -1.79 to 3.38). AO was assessed by WHt ratio (cut-off WC ≥0.5 for both genders) and British waist circumference (WC) references (cut-off ≥90 perc. for age and gender). Obesity was defined as BMI SDS >2.0 according to WHO (2007) BMI criteria.
Results: Prevalence of AO among 878 children estimated by WHt ratio was 9.9% for both gender, higher in boys than in girls (13.1% vs 6.9%, ð = 0.002) and statistically did not differ from prevalence of obesity by WHO (2007) BMI SDS - 8.3% (P = 0.244). Prevalence of AO measured by WC ≥90 perc. was 33.1% in total group, higher in girls than in boys without statistical difference (35.5% vs 30.7%, ð = 0.131). The frequency of AO among 79 children assessed by WHt ratio was 40.5% for both gender and also was comparable with frequency of obesity by WHO BMI - 36.7%. In this group, children with WHt ≥0.5 had higher fasting total cholesterol (P = 0.013), LDL (P = 0.02), triglycerides (P = 0.008), systolic (P = 0.019) and diastolic (P = 0.003) blood pressure, insulin (P < 0.001), HOMAIR (P < 0.001) and lower FGIR (P < 0.001) and QUICKI (P < 0.001) compared to children with WHt <0.5.
Conclusions: The study demonstrates high prevalence of AO in urban primary school children. AO defined by WHt ratio is associated with dyslipidemia, insulin resistance and increased blood pressure in children 9–13 years. WHt ratio is useful index to identify children with obesity and high-risk metabolic profile if BMI and WC percentile references are not available.

P-163-146

Obesity and insulin resistance in patients with juvenile idiopathic arthritis (JIA) contribute to early changes in cardiovascular system

B. Głowińska-Olszewska[1], A. Bossowski[1], E. Dobreńko[2], A. Hryniewicz[1], J. Konstantynowicz[2], W. Łuczyński[1] & J. Piotrowska-Jastrzębska[2]
[1]*Medical University of Bialystok, Department of Pediatrics, Endocrinology, Diabetology with Cardiology Division, Białystok, Poland;* [2]*Medical University of Bialystok, Department of Pediatrics and Developmental Disorders, Białystok, Poland*

Objective: The prevalence of obesity in children with juvenile idiopathic arthritis (JIA) and its' metabolic and cardiovascular consequences have not been studied. The objective of the study was to determine the prevalence of excess body mass in patients with JIA, and to investigate the influence of obesity onto metabolic and subclinical changes in cardiovascular system in this population.
Methods: Fifty-eight JIA patient, aged 7–18 (median: 13 years) were compared with 36 healthy, non-obese controls. Traditional cardiovascular risk factors (BMI, blood pressure, lipids, insulin resistance index HOMA), inflammatory markers (hsCRP, Il-6, TNFα, adiponectin) were studied together with intima media thickness (IMT), flow mediated dilation (FMD) and left-ventricle mass index (LVMi) being surrogate markers of subclinical changes in cardiovascular system.
Results: Thirteen JIA children (22%) were overweight/obese and had increased insulin level: 12.4 (11–14.3) vs 6.8 (3.8–8.9) in non-obese, P < 0.05, vs 6.6 (4.0–8.8) mU/ml in controls, P < 0.05, and elevated HOMA index: 2.7 (2.1–3.1) vs 1.5 (0.8–2), in non-obese JIA, P < 0.05, vs 1.45 (0.8–1.9) in controls, P < 0.05. We also found in obese group increased systolic blood pressure, cholesterol, triglycerides, hsCRP, and Il-6 compared to non-obese JIA and controls. FMD was decreased vs non-obese; and vs controls,

whereas IMT and LVMi were increased. BMI and HOMA index correlated positively with IMT, LVMi, and inversely with FMD.
Conclusions: Coincident obesity is common in JIA children and is associated with insulin resistance, dyslipidemia and increased inflammatory markers. These obesity-related metabolic disturbances additionally contribute to the subclinical atherosclerosis changes in JIA patients. Medical care of children with JIA should include strategies to prevent obesity development.
The study was supported by the Polish State Committee for Scientific Research (grant number NN407144639).

P-187-147

Changes in body mass index (BMI) over 2 decades

D.P. Flynn[1], V.C. Arena[2], M. Cedillo[3], D.J. Becker[1] & I.M. Libman[1]
[1]*University of Pittsburgh, Pediatric Endocrinology and Diabetes, Pittsburgh, USA;* [2]*University of Pittsburgh, Department of Epidemiology, Pittsburgh, USA;* [3]*Children's Hospital of Pittsburgh of UPMC, Nutrition, Pittsburgh, USA*

Objective: We have previously reported the rising frequency of weight excess in pediatric new onset T1D with with BMI associated with higher c-peptide levels. This study evaluates BMI trends at diagnosis (Dx) in later T1D cohorts diagnosed in three different periods and the relationship of BMI with autoantibody number and A1c over the first year, We postulated that
(i) there was a continual increase in overweight/ obesity
(ii) High BMI was associated with lower A1c and less autoimmunity.
Methods: 605 children <19 years, diagnosed between 1995–2002 (cohort 1), 2004–2006 (cohort 2), and 2008–2010 (cohort 3) were included. BMI z-scores and the % of subjects <25th, >75th, >85th and >95th BMI percentile were collected at Dx, 3, 6, and 12 months(m), compared across cohorts and related to A1c and islet autoantibody number. (IA2, GAD, insulin and ICA).
Results: There were no significant differences in mean BMIz between cohorts at any time with significant increase from 0.17 to 0.7 at 3 months. At Dx, Cohort 2 (28.7%) ($P < 0.05$) and 3 (24.1) ($P < 0.05$) had significantly fewer below the 25th percentile versus cohort 1 (37.3%); There were no significant differences at 3 months andlater. Higher BMIz and younger age predicted lower A1c at Dx and 3 months. Each one Z increase in BMI predicted a 0.34 lower % A1c at Dx and a 0.11 lower % A1c at 6 months ($P < 0.05$). Older age predicted a 1.03 higher % A1c at Dx ($P < 0.05$). There was no significant difference in mean A1c at any time by autoantibody number.
Conclusions: There was no further increase in mBMIz in this century. Significantly more in cohort 1 were <25% ile probably due to more severe clinical presentation in the past. Obese subjects have lower A1c in the first 6mths associated with more residual insulin secretion. Surprisingly, the degree of B cell destruction relected by autoantibody number had no effect on A1c at any time.

P-86-148

Leptin and adiponectin in obese children with and without fatty liver disease

R.A. Karam[1]
[1]*Zagazeg University, Biochemistry, Zagazig, Egypt*

Background: Pediatric nonalcoholic fatty liver disease is a chronic liver disease related to obesity, hyperinsulinemia insulin resistance. Liver cell injury results from free fatty acid toxicity or other oxidant stress.
Objective: This study aimed at investigating the relationship between the presence and severity of fatty liver as detected by liver ultrasound with body mass index (BMI), hyperlipidemia, insulin resistance, serum leptin, and serum adiponectin. AQ3.
Patients and methods: Twenty-five obese children were selected from the Pediatric Outpatient Clinic, Zagazig University Hospital, and the Ministry of Health Office in 2010. After performing liver ultrasound, they were classified according to the presence or absence of fatty liver into two groups. Group I consisted of 15 obese children with fatty liver, comprising nine boys and six girls. Their mean age was 12 ± 2.7 years, mean weight was 64.3 ± 14.19 kg, and mean BMI was 29.9 ± 2.5. Group II consisted of 10 obese children without fatty liver, comprising six boys and four girls. Their mean age was12.3 ± 2.2 years, mean weight was 68.6 ± 12.6 kg, and mean BMI was 27.5 ± 0.97.
Results: Liver enzymes, plasma insulin, homeostasis, triglycerides, and serum leptin were significantly higher in group I relative to group II patients. Serum adiponectin had significantly lower values in group I compared with group II patients. There was a highly significant positive correlation between serum leptin and BMI, cholesterol, triglycerides, and liver steatosis, whereas there was a highly significant negative correlation between serum adiponectin and all these parameters.
Conclusion: Hepatic fat accumulation in childhood obesity is strongly associated with the triad of insulin resistance, increased visceral fat, and hypoadiponectinemia.
Keywords: Children, fatty liver, obesity.

P-519-157

Prevalence of and factors associated with obesity among Pakistani school children - a school based cross sectional study

A. Jamil[1]
[1]*Health Services Academy, Islamabad, Pakistan*

Introduction: Childhood obesity is now a global problem and the epidemic is increasing in the developing world. It has also become an important public health problem among Pakistani children due to rapid urbanization, inequitable development and changes in life style in last few decades.
Methods: This cross sectional study was conducted on 501 students selected through simple random sampling from 10 high schools of an urban setting. We used the age and sex specific BMI cut off points of W.H.O to estimate Obesity. Interviews were conducted to inquire about food frequency, physical activity and other factors.
Results: Prevalence of overweight and obesity was 23% and 15%, in boys; and 16% and 8% respectively in girls. Children spent a mean of 20 hours on media on a typical week, 60% of them travelled inactively to schools, 50% schools did not have facilities for sports and 44% of the schools did not offer classes on physical education. In multivariate analysis girls were 77% protected against obesity, OR = 0.33 (CI = 0.16–68) and children in middle socioeconomic tertile were 3.43 times more likely to be obese. Rating oneself as poor athlete meant 5.5 times more likelihood of obesity and eating fruit more than 4 times a week meant 55% (OR = 0.45 CI=0.22–0.91) less likelihood of obesity. Those who wanted to lose weight had 7.75 times more likelihood of obesity.
Conclusions: Childhood obesity is determined by the factors in the home, school and society and a multidisciplinary approach is needed to prevent this rising epidemic in developing countries.

P-198-158

The metabolic syndrome in children and adolescent

I.V. Osokina[1]
[1]*State Research Institute for Studies of the North, Endocrinology, Krasnoyarsk, Russian Federation*

Introduction: Insulin resistance (IR) is a common feature of childhood obesity and a key component of the metabolic syndrome (MS).
Objective: The aim of this study was to evaluate the prevalence of MS among obese children and adolescent.
Methods: We examined 1760 schoolchildren at age 7–17 years. Obesity was revealed in 91 children (5.2%). Risk factors in the family such as DM2, hypertension, hyperlipidemia, obesity were recorded for the first degree relatives. All children underwent anthropometric measurements, an oral glucose tolerance test, assessment of blood pressure, plasma lipids. OGTT accompanied by four point of insulinemia was performed. HOMA index was calculated according to the standard formula. MS was diagnosed according to a classical definition (Weiss's criteria).
Results: In the group of obese children metabolic syndrome was found in 18 (19.8%). BMI was 30.9 ± 3.4 kg/m^2. The prevalence of the single componentsof the MS was follows: hypertension 52.6%, hypertriglyceridemia 38.2%, glucose intolerance 17.6%, IR revealed in 25% children. HOMA index was 4.6 ± 3.3 peak insulinemia was 112 ± 24.1 mIU/l.
Conclusion: This study showed a high prevalence of the MS among obese schoolchildren.

P-331-159

Childhood overweight and obesity - the relationship between birth weight and insulin resistance

J. Witek[1], E. Pańkowska[1], A. Karney[2], H. Dyląg[3] & M. Błazik[1]
[1]*Institute of Mother and Child, Diabetes Outpatient Clinic, Warsaw, Poland;* [2]*Institute of Mother and Child, Day Hospital, Warsaw, Poland;* [3]*Institute of Mother and Child, Department of Nutritional Therapy, Warsaw, Poland*

Background: Obesity in children is associated with an increased risk of insulin resistance (IR) which precedes the development of pre-diabetes. Factors influencing IR are still under discussion. Children small for gestational age (SGA) and large for gestational age (LGA) are often at risk of developing IR.
Objective: To assess the prevalence of IR and the relationship between birth weight and IR in obese children.
Methods: The study included 145 patients (66 girls and 79 boys) aged 2.8–17.5 years (median: 9.3 years) with a BMI ≥90 pc. Family history in terms of parents' obesity and child's birth weight was investigated. Fasting glucose, insulin, CRP and blood lipids were measured. IR was assessed using homeostasis model assessment (HOMA-IR), quantitative insulin sensitivity check index (QUICKI) and fasting glucose/insulin ratio (FGIR). Based on literature data we adopted the following cut-off points for diagnosing IR: HOMA-IR ≥2.5, QUICKI ≤0.34 and FGIR ≤7.0.
Results: (presented as median and frequency (%):
In obese children we observed a positive correlation between birth weight and QUICKI index (r = 0.24; P < 0.05) and FGIR (r = 0.27; P < 0.05). A negative correlation with fasting insulin (r = -0.26; P < 0.05) and HOMA-IR (r = -0.24; P < 0.05) was confirmed. HOMA-IR ≥2.5 was observed in 9.1% of overweight and in 31.7% of obese children; QUICKI ≤0.34 in 27.3% and 43.1%; FGIR ≤7.0 in 13.6% and 35.8% respectively.
Conclusions: (i) The prevalence of IR in obese children is not lower than 30%.
(ii) Obese children SGA are more susceptible to develop IR and diabetes in future.
(iii) The risk of pre-diabetes in obese children should be estimated on the basis of IR indexes rather than on fasting glucose alone.
Table: Birth weight, glucose, insulin and IR indexes.

BMI≥90c	Birth weight (g)	glucose (mg/dl)	Insulin (mIU/l)	HOMA-IR	QUICKI	FGIR	glucose≥100	glucose∈(90-100)	Insulin>15 mIU/l
Overweight (n=22)	3520	83	6.86	1.44	0.36	12.09	0%	0%	9.1%
Obesity (n=123)	3410	82	8.98	1.89	0.34	9.34	1.7%	12.2%	24.4%

[Birth weight, glucose, insulin and IR indexes.]

P-28-160

A study of adiponectin in children with diabetes mellitus

B.A. Ali[1], D.M. Mahrous[1], A.M. Abd alla[2] & M.G. Fekry[1]
[1]*Faculty of Medicine, Minia University, Pediatrics, Minia, Egypt;*
[2]*Faculty of Medicine, Minia University, Biochemistry, Minia, Egypt*

Introduction: Adiponectin is a hormone produced by adipose tissue.It is exclusively secreted by adipocytes and appears to play a role in the pathophysiology of obesity, DM, and its co-morbidities.
Aim: To assess adiponectin level in diabetic children (T1DM and T2DM) and correlate it with different parameters.
Subjects and methods: This study included two groups; Group I: 164 diabetic patients who furtherly subdivided into: group Ia (T1DM) included 142 patients & group Ib (T2DM) included 22 patients and finally group Π included 150 apparently healthy children as a control group, age and sex matched to diseased group. They were subjected to thorough history taking, clinical examination and laboratory investigations including: HbA_{1c}%, fasting C-peptide level, lipid profile and fasting serum adiponectin level.
Results: Adiponectin level did not differ significantly betweenT1DM and T2DM but it was significantly higher in diabetic patients than the control. In T1DM, adiponectin had positive significant correlation with duration of DM &WC while in T2DM, it had positive significant correlation with the dose of insulin and negative significant associations with diastolic blood pressure, cholesterol and C-peptide level.
Conclusion: Adiponectin did not significantly different between T1DM and T2DM. In T1DM, adiponectin significantly associated with long diabetes duration and WC while in T2DM, adiponectin was significantly associated with C-peptide, DBP and cholesterol indicating its protective role against metabolic complications of DM.

P-140-161

Hypertriglyceridemic waist phenotype and atherosclerotic risk in obese children

E.-D.C. Casariu[1], B. Virgolici[2], D. Lixandru[2], A. Totan[2], D. Miricescu[2], M. Greabu[2] & M. Mohora[2]
[1]*'Carol Davila' University of Medicine and Pharmacy, Bucuresti, Romania;* [2]*'Carol Davila' University of Medicine and Pharmacy, Department of Biochemistry, Bucuresti, Romania*

The hypertriglyceridemic waist phenotype has been proposed in adults as a predictor of the metabolic syndrome. Metabolic syndrome is associated with inflammation, insulin resistance and represents an important cardiovascular risk factor. The aim of this study is to find the modified metabolic, inflammatory and oxidative stress parameters in hypertriglyceridemic waist phenotype obese children. Fortyone obese children (10–18 years old) referred for consultation at a general practitioner's in one

year, were included in the study. Thirty controls were also involved. Modified ATP III cut points for serum triglycerides (110 mg/dl) and waist circumference (90th percentile for age and sex) were used to divide obese children. Hypertriglyceridemic waist fenotype (n = 17) and obese nonhypertriglyceridemic (n = 24) groups were formed. Ultrasounds were used for fatty liver. In hypertriglyceridemic waist fenotype obese children, the values for triglycerides ($P < 0.0001$), uric acid ($P < 0.004$), alanine aminotransferase (ALT) activity ($P < 0.05$), gamma-glutamyl transpeptidase (GGT) activity ($P < 0.01$), apoB/apoA ($P < 0.05$), peptide C ($P < 0.05$), leptin ($P < 0.05$) and waist circumference ($P < 0.04$) were increased, while apoA ($P < 0.006$), HDL-cholesterol ($P < 0.004$) were decreased. No difference for, inflammatory (C-reactive protein, fibrinogen, ceruloplasmin) and oxidative stress markers (blood glutathione, GSH), plasma malondialdehyde (MDA) were observed. ALT and GGT activities were correlated with fatty liver. In hypertriglyceridemic waist fenotype obese children, dyslipidemia, high uric acid, high leptin and fatty liver (with higher ALT and GGT activities) are the culprits for the increased atherosclerotic risk in these subjects.

P-168-162

Contemporary BMI SDS trajectories in a paediatric cohort with type 1 diabetes

M. Boyle[1], M. O'Connell[1,2,3], F. Cameron[1,2,3], N. Wong[2], S. Arnup[4] & S. Donath[4]

[1]*Murdoch Children's Research Institute, Endocrinology and Diabetes, Melbourne, Australia;* [2]*Royal Children's Hospital, Endocrinology and Diabetes, Melbourne, Australia;* [3]*University of Melbourne, Department of Paediatrics, Melbourne, Australia;* [4]*Royal Children's Hospital, Clinical Epidemiology and Biostatistics Units, Melbourne, Australia*

Objectives: To assess whether children diagnosed with T1DM in recent years varied in their BMI SDS trajectories following diagnosis compared to their non-diabetic peers and whether there was an association between BMI SDS trajectories and different insulin regimens and dosages or quality of glycaemic control.

Methods: Retrospective data were collected on BMI SDS, duration of diabetes, insulin regimen and dosage, and HbA1c for 436 patients who were diagnosed with T1DM after 01/01/2006 and subsequently followed up at our outpatient department for at least twelve months.

Results: On average, females had a change in BMI SDS per year of 0.01, with an increase over 6 years from 0.70 to 0.75. Males had a change of -0.02, with a decrease from 0.85 to 0.71 over 6 years. Children on CSII had a change of 0.04, MDI of 0.01, and BD of -0.04 per year. Following a switch to CSII from MDI or BD there was a change of 0.04. Patients with good glycaemic control maintained for twelve months or more had a change of -0.04, while those with poor control had a change of 0.05.

Conclusions: There were no significant changes found in BMI SDS following diagnosis of T1DM in either female or male patients. Different insulin regimens or dosages were not associated with any significant change in BMI SDS, in particular patients who were switched to CSII did not show any significant change. No particular patterns in BMI SDS trajectories were demonstrated in patients with different qualities of glycaemic control.

P-137-163

Indian Diabetes Risk Score (IDRS) for type 2 diabetes mellitus screening in young adults

P. Ashok[1], J.S. Kharche[1], B. Balsubramaniyan[1] & A.R. Joshi[1]

[1]*Bharati Vidyapeeth Medical College, Physiology, Pune, India*

Background: According to World Health Organisation, a disease of the middle-aged and elderly, type 2 diabetes has recently escalated in all age groups and is now being identified in younger and younger age groups, including adolescents and children, especially in high-risk populations. This underscores the need for mass awareness and screening programmes to detect diabetes at an early stage. For this purpose we have planned to use a simplified Indian Diabetes Risk Score (IDRS) for prediction of diabetes in 1000 undergraduate students of Bharati Vidyapeeth Deemed University. This is a result of one batch which underscore the need for further action.

Method: 132 undergraduate 1st MBBS students are scored using IDRS which includes age, family history of diabetes, exercise status and Waist circumference. After scoring them they are categorised into mild, moderate and high risk group.

Result: We get 8%, 79% and 13% student in high risk, Moderate & Low risk group respectively for developing type 2 DM.

Conclusion: This underscores the need for further investigations to detect diabetes at an early stage and to overcome the disease burden of diabetes in future. Therefore preventive diabetes education programme & promotion of physical activity will be future plan of action which can be suggested in the form of regular exercise and diet planning for the students as part of an integrated approach.

P-290-164

The prevalence of insulin resistance in children

O. Zagrebaeva[1] & A. Solntsava[1]

[1]*Belarusian State Medical University, Paediatrics, Minsk, Belarus*

Objectives: The aim of our study was to evaluate the prevalence of insulin resistance in children.

Methods: 135 children were examined retrospectively in the endocrinological department of University hospital (Minsk) over 2011 year. They were divided into 3 groups: group 1 (n = 107) - obese children without disorders of carbohydrate metabolism, mean ± sd age 12.3 ± 3.5 years; group 2 (n = 13) - obese with impaired glucose tolerance (IGT) or impaired fasting glucose (IFG), 12.85 ± 2.4 years; group 3 (n = 15) - children with normal weight and IGT or IFG, 11.4 ± 3.5 years ($P = 0.4$). Insulin (Ins), standart oral glucose tolerance test (OGTT) with the calculation of HOMA-IR and CARO indexes, measurement of body mass index (BMI) were held to all patients. The results were processed using the Statistica 6.1.

Results: BMI group 1 31 ± 6.1 kg/m^2, group 2 32.1 ± 6.2 kg/m^2, group 3 18.7 ± 2.4 kg/m^2 ($\delta = 0.03$). Basal and postprandial plasma glucose levels didn't exceed normal limits by conducting OGTT in group 1 (fasting plasma glucose 4.9 ± 0.68 mmol/l (norm 3.3–5.5), after 2 hours 5.63 ± 0.9 mmol/l (norm <7.8). Group 2 basal glucose levels 5.6 ± 0.35 mmol/l, postprandial 7.7 ± 1.7 mmol/l; group 3 5.4 ± 0.5 mmol/l ($P = 0.4$) and 7.9 ± 1.1 mmol/l ($P = 0.8$). The levels of fasting Ins group 1 13.2 ± 8 mU/ml (2.1–22), group 2 23.4 ± 7 mU/ml, group 3 13.8 ± 7 mU/ml ($\delta = 0.8$). HOMA-IR index group 1 3.52 ± 1.5 (<2.77), group 2 5.96 ± 2.7, group 3 2.8 ± 1.5 ($\delta = 0.6$). CARO index group 1 0.39 ± 0.11 (>0.33), group 2 0.28 ± 0.16, group 3 0.53 ± 0.11 ($P = 0.4$).

Conclusions: Insulin resistance with maintaining the basal and postrandial normoglycemia was noted by conducting OGTT in all patients with obesity and IGT or IFG. It can say about great probability of futher development of DM2 in children with obesity and disorders of carbohydrate metabolism.

Poster Tour 1- Pumps and Sensors

P-164-201

Monthly use of a real-time continuous glucose monitoring system as an educational and motivational tool for poorly controlled diabetes type 1 adolescents

B. Głowińska-Olszewska[1], M. Tobiaszewska[1], W. Łuczyński[1] & A. Bossowski[1]

[1]*Medical University of Bialystok, Department of Pediatrics, Endocrinology, Diabetology with Cardiology Division, Białystok, Poland*

Purpose: Experience with use of real-time continuous glucose monitoring systems (RT-CGMS) in teenagers with diabetes type 1 (T1DM) is limited. The aim of the study was to assess the possibility to improve glycaemic control and to characterize the group of adolescents, who may gain long-term benefits from use of the RT CGMS system.

Patients and methods: Forty T1DM patients, aged mean 14.6 years, with diabetes duration 7.4 years, mean HbA_1c before the study 9.3% were recruited. The analysis was based on one-month period of glucose sensors use combined with the thorough family support. Patients were analyzed in groups according to baseline HbA_1c level: below and above 7.5%, below and above 10.0%, and in groups with improvement of HbA_1c after 3 months or not. Patient's satisfaction on the basis of questionnaire was also assessed. Parameters of glycaemic variability during the first and last sensor use were compared.

Results: HbA_1c level in entire study group decreased by mean 0.5% after 3 months: 9.3 ± 1% vs 8.8 ± 1.6% ($P < 0.001$). In the group with HbA_1c improvement (67% of patients), reduction was the highest among all comparisons: 9.0 ± 1.3% vs 8.0 ± 1.2% ($P < 0.001$). Only the group with the baseline HbA_1c >10%, did not achieve any significant improvement: 11.2 ± 0.5% vs 10.9 ± 1.1 ($P = 0.06$). The largest favourable changes in glycaemic variability parameters during last sensor use were reported in the group with improvement of HbA_1c after 3 months. In satisfaction questionnaire the lowest scores were reported by group of patients with initial HbA_1c above 10%, while the highest scores were found in the group with improvement of HbA_1c after 3 months.

Conclusions: Short-term use of CGMS RT, united with satisfaction questionnaire, performed in poorly controlled teenagers with diabetes type 1, can be useful to achieve quick metabolic advantages and in defining the group of young patients, who can benefit from long-term CGMS RT use in metabolic control improvement.

P-395-202

Prospective multicentric observational study: use of continuous glucose monitoring in diabetic children below 7 years old

J. Amsellem-Jager[1], C. Marques[1], E. Bonnemaison[1], C. Hasselmann[1], N. Faure[1], I. Mercat[1], S. Perdereau[2], C. Roze[2], K. Dieckmann[3], H. Mouna[3], A.-G. Munega[3] & F. Labarthe[1]

[1]*CHRU Tours, Hospital Gatien de Clocheville, Pediatric Specialities Unit, Tours, France;* [2]*General Hospital of Orleans, Pediatric Unit, Orleans, France;* [3]*General Hospital of Blois, Pediatric Unit, Blois, France*

Objectives: Evaluate efficiency and safety of long term continuous glucose monitoring (CGM) coupled with insulin pump use in type 1 diabetic children below 7 years old.

Methods: Since September 2010, long term CGM was proposed to every child with type 1 diabetes younger than 7 years old and treated by insulin pump. The medical follow-up was realized by the University Hospital of Tours, General Hospital of Blois and Orleans. Prospective data collect was done every three months during a medical visit. Thirty-six children were included. Twenty-three children accepted the long term CGM (CGM group) and 13 refused (control group). Median ages were 39 months [12–89] in the CGM group and 54 months [17–81] in the control group. At the start of our study, the HbA1c average were 7.79% +/− 0.74 in CGM group vs 7.83% +/− 0.79 in control group.

Results: At 1 year, we reported the HbA1C average: 7.67% +/− 0.65 in CGM group vs 7.93% +/− 0.79 in control group. 40% of CGM patients had a HbA1c <7.5% vs 50% in control group regardless more significant severe hypoglycemia in the control group (0.12 event/patient/year in CGM group vs 0.61) and number of hospitalization (0/year/patient in CGM group vs 0.69). Number of self monitoring blood glucose was also reduced (3.95/day/patient at inclusion then 3.69 at 1 year) and daily insulin requirement was stable in CGM group. We analyzed the alarm low stop use, when it is fixed at 0.4 g/l, 2.7 events/months/patient were observed which 66% during the night. That's why children and their family were satisfied especially regarding hypoglycemia and hyperglycemia detection. Only three children stopped CGM because of pain during the sensor settle and utilization difficulties.

Conclusion: HbA1c are close to the ISPAD recommendation with a significant decrease in hypoglycaemia, hospitalization and self monitoring blood glucose in CGM group. Good satisfaction has to be notified by the patients. Although these results need to be confirmed, our study lasts 2 years.

P-161-203

Comparison of the risk of complications in children TD1: different types of insulin therapy have been received since the moment of disease manifestation

I. Rybkina[1], E. Pronina[2], E. Petryaykina[2], I. Koltunov[2], I. Garyaeva[2] & T. Michaylova[2]

[1]*Morozov Children City Clinical Hospital, Endocrinology, Moscow, Russian Federation;* [2]*Morozov Children City Clinical Hospital, Moscow, Russian Federation*

One of the main problems to manage type 1 diabetes in children is the earliest prevention of microvascular complications of the disease.

Objective: Compare the risk of complications such as DT1 in the groups of children who use insulin pump therapy and insulin therapy with injection pens after diagnosis of the disease within 5 years.

Materials and methods: Forty-five children - 25 boys and 20 girls on insulin pump therapy (group 1), the average age of 2.8 ± 1.7 years and 46 children - 20 girls and 26 boys with insulin injection pens (group 2), average age of 3.1 ± 1.5 years. Visits to the doctor to determine the level HbA1C every 3 months. Twice a year: monitoring of changes in the liver by ultrasound, survey ophthalmologist, indicators of neuromuscular conduction with electroneuromyographic study, assessment of microalbuminuria.

Results and discussion: According to the results after 5 years the average NvA1s in group 1 was 7.3 ± 0.9%, in group 2 8.2 ± 1.2%. The overall mean decrease HbA1C for 5 years a group of children identified as 4.7 ± 0.64% and 3 ± 0.96% in group 2. Signs of liver revealed fatty liver in 30 ± 3.4% of children in group 1 and 55 ± 1.3% of children in group 2, the signs of polyneuropathy ENMG determined from 24.7 ± 1.9% of

children in group 1 and 32 9 ± 1.32% of children in group 2. No signs of retinopathy and microalbuminuria was found in children of both groups. All differences in the groups were significant ($P < 0.05$).
Conclusions: Identified the best indicators of carbohydrate metabolism with less amount of risk of microangiopathy using insulin pump therapy in children with type 1 diabetes since the beginning.

P-295-204

Does glycemic control really improves under insulin pump versus multiple daily injections in type 1 diabetes in all pediatric ages?

I. Kosteria[1], E. Koui[1], J.-D. Arditi[1], G.P. Chrousos[1] & C. Kanaka-Gantenbein[1]
[1]*Diabetes Center, Division of Endocrinology, Diabetes and Metabolism, First Department of Pediatrics, University of Athens, Athens, Greece*

Insulin pump (CSII) is considered the best regimen for good glycemic control in type 1 diabetic (T1D) children.
Objectives: To evaluate whether glycemic control improves in all pediatric ages under CSII than under multiple daily injections (MDI).
Materials and methods: The study population consisted of 73 children (48% ♂), 43 (58.9%) on CSII and 30 (41.1%) sex and age-matched on MDI (mean ± sd: 11.1 ± 4.5 years for CSII, 10.7 ± 2.3 years for MDI). All had similar diabetes duration at initiation (CSII: 45.1 ± 38.3 months; MDI: 42.6 ± 34.6 months) and received the same intensified education. HbA1c, basal insulin dose and BMI z-score changes over 12 months and severe hypo/hyperglycemic incidents (SHHI) were compared and correlated to children's age, sex, diabetes duration and prior insulin regimen.
Results: No significant changes were noted concerning HbA1c and BMI z-score neither between the different time points under CSII nor between CSII and MDI at 12 months. There was a significant reduction in mean basal insulin/kg between baseline and 12 months under CSII (baseline: 0.5 IU/kg, final: 0.4 IU/kg; $P = 0.034$). A negative correlation between the change in basal insulin/kg and both diabetes duration and child's age at pump initiation was observed ($r = -0.73$; $P = 0.007$ and $r = -0.63$; $P = 0.037$ respectively), when the basal insulin prior to CSII was isophanic. In children on long-acting analogues before CSII, a significant correlation was observed between HbA1c change and pubertal stage: Prepubertal children showed a decrease in HbA1c (mean: -0.57 ± 0.48) while teenagers showed an increase (mean: 0.21 ± 0.87) ($P = 0.037$). SHHI were rare in both groups.
Conclusions: CSII and MDI, under appropriate education, are equally effective and safe in the treatment of T1D children, regarding HbA1c, SHHI and BMI. Insulin pump use decreases basal insulin needs. Under CSII, prepubertal children demonstrate an improvement of their HbA1c, while pubertal ones a deterioration in the first year on the pump.

P-190-205

Validation in French-language of the scale measuring satisfaction with and impact of continuous glucose monitoring (CGM-SAT) in pediatric T1D patients and parents

N. Tubiana-Rufi[1], J. Schroedt[2], S. Guilmin-Crépon[1,2], V. Sulmont[3], A.-S. Salmon[4], C. Le Tallec[5], R. Coutant[6], F. Dalla-Vale[7], C. Stuckens[8], H. Bony[9], H. Crosnier[10], F. Kurtz[11], J.-C. Carel[1] & C. Alberti[2]
[1]*Robert Debre Hospital, APHP, Pediatric Endocrinology and Diabetology, Paris, France;* [2]*Robert Debre Hospital, APHP, Clinical Research Unit, Paris, France;* [3]*Hopital Alpes Leman, Diabetology, Annemasse, France;* [4]*American Memorial Hospital, CHU, Pediatric Unit, Reims, France;* [5]*CHU Hopital des Enfants, Pediatric Diabetology, Toulouse, France;* [6]*CHU, Pediatric Endocrinology and Diabetology, Angers, France;* [7]*CHU Hopital Arnaud de Villeneuve, Pediatric Unit, Montpellier, France;* [8]*CHU Hopital Jeanne de Flandre, Pediatric Unit, Lille, France;* [9]*CHU Hopital Nord, Pediatric Unit, Amiens, France;* [10]*CHI, Pediatric Unit, Poissy, France;* [11]*CHI, Pediatric Unit, Saint-Avold, France*

Objectives: To validate in French language and French T1D pediatric population the CGM-SAT scale (*JDRF. Diabetes Technol Ther 2010*).
Methods: Translation and back-translation of the 44-item scale were performed by 5 independent translators. After a pilot study, the final French version was used in the StartIn trial enrolling 141 T1D patients aged 3.5–17.9 years. Psychometric characteristics of the French version (F-CGM-SAT) were analyzed in 168 questionnaires completed by 84 patients aged ≥9 years and their parents after 3 months of continuous CGM use (Paradigm Veo®, Medtronic). Median rate of CGM use (% of total time with sensor glucose values over study time) was 77.1% (15–97.6). Results were compared to the US validation data in the same age-group population (*given in parenthesis*).
Results: The Cronbach's alpha coefficients for the F-CGM-SAT were 0.91 for patients and 0.92 for parents (vs *0.95 and 0.95)*. Spearman correlation coefficient between parents and youth scores was 0.58 for the F-CGM-SAT (vs *0.52)*. Factor analysis found two factors that emerged in the F-CGM-SAT: Benefits (19 items, $\alpha = 0.87$) and Hassles (22 items, $\alpha = 0.93$) of CGM, accounting for 24% and 13% of score variance, respectively (vs *33 and 9%)*. Significant correlations of F-CGM-SAT with rate of CGM use during 3 months support the convergent validity. Subjects and parents reported high overall satisfaction with the CGM, with average item scores of 3.6 ± 0.5 for patients and 3.7 ± 0.5 for parents (vs *3.6 ± 0.5 and 3.8 ± 0.5* respectively).
Conclusions: The French version of CGM-SAT is reliable and valid to measure T1D pediatric patients and parents-reported CGM outcomes, and give similar psychometric properties than the original US tool.

P-34-206

Malfunction of insuline pumps in children with diabetes mellitus type 1

S. Michaud[1] & L. Geoffroy[1]
[1]*Centre Hospitalier Universitaire Sainte-Justine, Endocrinologie et Diabète, Montreal, Canada*

Introduction: Continuous subcutaneous insulin infusion delivered via insulin pump has enabled patients with Diabetes Mellitus type 1 to improve metabolic control and lead healthier lives. However, potential malfunction of these pumps is an issue of concern as it may result in serious complications, including diabetic ketoacidosis (DKA) and severe hypoglycemia.
Goal: To determine the type and frequency of insulin pump malfunction in children.

Methods: Children aged 18 years or less using insulin pumps were recruited between October 2011 and January 2012 from the Centre Hospitalier Universitaire Sainte-Justine diabetes clinic in Montreal, Canada. Parents completed a questionnaire. They were asked to report technical problems that had occurred in the previous year.
Results: Information was provided by the 148 patients who had an appointment at the clinic between october 2011 and january 2012 and who used one of four brands of insulin pump: Animas in 95 (64%), Medtronic in 46 (31%), Accuchek in 6 (4%) and Cozmo in 1 (0.06%). Of the 148 patients, 61 (41%) experienced at least one system failure in the previous year; pump replacement was required in 55 (37%) cases. The system failure rate was essentially the same among the different kind of insulin pumps (33%–39%). The most frequent problems involved malfunctionning buttons (29%), followed by defective cases (22%), and insulin administration failure (18%). 11% experienced complete pump failure. Problems downloading pump data occurred in 5% of patients.
Conclusion: Insulin pump system failure is relatively common, with any system failure occurring in 41% of patients. Families and health professionals need to be informed and remain alert to these security breaches that can negatively affect children's health. Understanding the potential problems with insulin pumps will help strengthen insulin pump benefits and safety.

P-531-207

Evaluation of glycaemic control using insulin pump therapy in 'poor' candidates and non insured children in a rural diabetic youth clinic

P. Goss[1]
[1]*Gippsland Paediatrics, Diabetes Unit, Sale, Australia*

Objectives: To evaluate the effect of Insulin Pump Therapy (IPT) on glycaemic control and patient satisfaction in children traditionally considered as ''poor candidates'' or without health insurance.

Methods: Gippsland Paediatrics manages most diabetic youth in a rural region comprising 95 000 people. Over 90% of our patients have trialed IPT with 84% still managed with IPT. Guidelines for IPT commencement were patient/parent request and team agreement on safety. Hence we commenced many patients on IPT that would not have satisfied traditional guidelines. ''Good'' candidates satisfied consensus view of at least 5 of the 6 most common criteria for IPT commencement. ''Poor'' candidates satisfied 4 or less criteria. Outcome was measured by comparing the average HbA1c of ''good'' and ''poor'' candidates and of insured and non-insured patients for the 12 months prior to IPT commencement with the average HbA1c at 3 months, over the first 12 months and over the second 12 months using student t test.
Results: Thiry-four ''good'' candidates, (average age 12.6 ± 5.8 years), improved HbA1c from 8.2% ± 0.71 to 7.1% ± 0.52 ($P < 0.001$) at three months, 7.1% ± 0.74 during first year ($P < 0.0001$) and 7.52% ± 0.97 during the second year. ($P = 0.006$) 36 ''poor'' candidates (average age 14.7 ± 4.7 years) with pre-pump HbA1c 9.8% ± 1.51 improved to 8.5% ± 1.30 ($P < 0.001$) at 3 months, 8.3% ± 0.71 over the first year ($P < 0.001$) and 8.5% ± 0.98 ($P < 0.001$) over the second year. ''Good'' candidates had a significantly better HbA1c at 1 and 2 years compared to ''poor'' candidates. ($P < 0.001$) Uninsured patients improved HbA1c by a similar margin to insured patients. ''Poor'' candidates responded positively in all aspects of a patient satisfaction survey.
Conclusions: Insulin Pump Therapy, managed by a skilled rural multidisciplinary team using emotional and peer support, significantly improved glycaemic control over a 2 year period in young patients traditionally considered ''poor'' candidates and in those without private health insurance.

Poster Tour 2 - Pumps and Sensors

P-321-177

Continuous glucose monitoring may improve metabolic control in children and adolescents with type 1 diabetes

M.H. Andersson[1,2], M. Landin-Olsson[1] & A. Carlsson[1,2]
[1]*Lund University, Clinical Sciences, Lund, Sweden;* [2]*Skåne University Hospital, Lund, Sweden*

Objectives: HbA1c is generally accepted as a measure of metabolic control and HbA1c close to normal reduces the risk of diabetic long-term complications. Devices for continuous glucose monitoring (CGM) have been used in clinical practice since the 1990s and studies have shown that they improve metabolic control among adults. However, CGM's effect on metabolic control among children and adolescents is still controversial. In this retrospective study we wanted to investigate the metabolic effect of CGM when used on paediatric patients at Skåne University Hospital.
Methods: 103 children with type 1 diabetes who had used a CGM at the paediatric clinic at Skåne University Hospital were included. Patient data were collected from each patient's medical record. HbA1c values at baseline (time for initiating CGM), 3, 6 and 12 months were used for evaluating the effect of CGM within the whole study population as well as in subgroups according to age and HbA1c at baseline. Values are mean ± SEM.
Results: The whole group improved their HbA1c significantly ($P < 0.001$) from baseline (71.32 ± 1.39 mmol/mol) to 3 months (68.87 ± 1.29 mmol/mol). The improvement was sustained at 6 ($P < 0.01$) but not at 12 months. Patients with HbA1c 380 mmol/mol at baseline achieved a significant ($P < 0.05$) reduction of HbA1c from baseline (90.79 ± 1.73 mmol/mol) to 3 months (81.92 ± 2.35 mmol/mol) and the reduction was sustained at 12 months. Neither of the other subgroups achieved a sustained improvement of HbA1c.
Conclusions: CGM seems to improve metabolic control in children with type 1 diabetes especially when used on patients with high (380 mmol/mol) HbA1c.

P-333-178

Use of the low glucose suspend (LGS) feature results in significant reduction in hypoglycemia in pediatric and adult patients with type 1 diabetes

P. Agrawal[1], J.B. Welsh[1] & F.R. Kaufman[1]
[1]*Medtronic, Inc., Northridge, United States*

Objectives: The use of the Low Glucose Suspend (LGS) feature, which automatically stops insulin delivery for 2 hours when a low glucose suspend threshold is met, has allowed for significant reductions in the duration and severity of hypoglycemia in prior studies. The LGS feature's effect on glycemic parameters in pediatric and adult patients was studied on days when continuous glucose monitoring sensors were worn.
Methods: Data from patients (self-identified as age ≤15, $n = 2176$, or age >15, $n = 5634$) outside the US using the Veo insulin pump system were uploaded to the CareLink Personal database from 1/10 to 11/11. CGM data were used to compare glycemic parameters on LGS-ON vs LGS-OFF days.
Results: The LGS feature was used on 74.2% of days that sensors were worn by those age ≤15 and was used on 73.4% of days that sensors were worn by those age >15. Younger users averaged 1.06 LGS events per day, while older users averaged 0.87 LGS events per day. On LGS-ON days, significant reductions in hypoglycemic sensor glucose readings were realized in both age groups (Table).
Conclusions: The LGS feature was designed to decrease the amount of time spent in hypoglycemia. Data from routine home use support its effectiveness in adult and pediatric populations. Automation of insulin delivery to reduce hypoglycemia appears to be a viable strategy for pediatric patients with type 1 diabetes.

Table: Percentage reduction in hypoglycemia with LGS use.

	Age ≤15		Age >15	
Sensor Glucose Range	% Reduction	P-value	% Reduction	P-value
≤50 mg/dl	45.61%	0.034	46.07%	<0.001
≤60 mg/dl	32.61%	<0.001	36.2%	<0.001
≤70 mg/dl	28.45%	<0.001	31.81%	<0.001
≤80 mg/dl	25.71%	<0.001	28.03%	<0.001

P-450-179

Diabetes control did not worsen after insulin pump discontinuation in non-compliant adolescents with type 1 diabetes

Z. Sumnik[1], Z. Hlavka[2], K. Volna[1], S. Kolouskova[1], K. Stechova[1], B. Obermannova[1], O. Cinek[1] & J. Lebl[1]
[1]*2nd Faculty of Medicine, Charles University in Prague and University Hospital Motol, Department of Pediatrics, Prague, Czech Republic;* [2]*Faculty of Mathematics and Physics, Charles University, Department of Probability and Mathematical Statistics, Prague, Czech Republic*

Objectives: Insulin pump (IP) therapy has proven its effectiveness also in children and adolescents with type 1 diabetes. Its discontinuation because of non-compliance is not frequent, yet acceptable in poorly controlled subjects. We investigated whether this termination of IP therapy due to non-compliance leads to further worsening of diabetes control.
Methods: We included all 39 children who terminated IP therapy due to ineffectiveness in the last 12 years (39 children aged median 15.2 years, IQR 13.5–16.5 years, median time on IP 3.3 years, IQR 2.3–4.7 years, mean HbA1c on IP 87 ± 10 mmol/mol). Their HbA1c were assessed on the background of all other patients regularly followed-up at our diabetes center. The results of all HbA1c values (24941 results gained between 1999 and 2011 from 885 patients, including 227 treated by IP) were analyzed as a dependent variable in a model using generalized estimating equations (GEE) with predictors influencing course of the disease (date of birth, sex, age at diabetes onset, calendar year, date of IP start and date of IP discontinuation). Cubic splines have been used empirically to model continuing variables.
Results: We did not observe significant increase in HbA1c after the termination of IP therapy during the 24 months follow-up. HbA1c increased by 3.8 mmol/mol during the first 12 months off the IP ($P = 0.07$ vs last year on IP) and by 2.8 mmol/mol ($P = 0.47$) as compared to the last year on IP. Patients who remained on IP had significantly lower HbA1c as compared both to children on other therapy modalities ($P < 0.001$), and their own results before the IP therapy ($P < 0.001$).
Conclusions: Insulin pump discontinuation does not cause significant worsening of diabetes control in non-compliant adolescents with type 1 diabetes.

P-484-180

Therapy with continuous subcutaneous insulin infusion in infants with diabetes

A. Brandt[1], M. Cuszlag-Wajda[2], G. Deja[3], E. Petriczko[4], A. Horodnicka-Józwa[4], I. Techmańska[1], K. Korzeniowska[1], M. Borowiec[5], M. Mincewicz-Wysocka[2], A. Świercz[2], E. Piontek[2], M. Walczak[4], M. Szalecki[2], A. Szadkowska[5], P. Jarosz-Chobot[3], W. Młynarski[5] & M. Myśliwiec[1]

[1]*Medical University of Gdańsk, Gdańsk, Poland;* [2]*Clinic of Endocrinology and Diabetology, IPCZD, Warsaw, Poland;* [3]*Medical University of Silesia, Katowice, Poland;* [4]*Pomeranian Medical University, Szczecin, Poland;* [5]*Medical University of Łódź, Łódź, Poland*

Objective: The etiology and treatment of diabetes in the infancy is a subject of many studies. The aim of the study was to analize cases of children with Neonatal Diabetes Melittus (Transient - TNDM and Permanent -PNDM) and with Diabetes type 1 (DM1) diagnosed in the first 12 months of life and treatment with continuous subcutaneous insulin infusin (CSII) and attempt to create an algorithm of therapy.

Methods: Medical data of seven patients with NDM (one with TNDM and six with PNDM) and seven patients with DM1 diagnosed in 1 year of life from Pediatric Diabetology Departments in Łódź, Gdańsk, Warsaw, Katowice and Szczecin were studied.

Results: NDM was diagnosed from 1 to 49 day of patients life (avarage age 14 days). Avarage birth weight was 2300 g and 9 points in APGAR scale. CSII was started in this group of patients when their body weight was 3030 g. In first day of CSII total daily insulin (TDI) dose was 0.88 unit per kilogram and 60% of TDI was given in basal rate and 40% in boluses. In 6 month of life avarage body weight of children was 6200 g, the TDI 0.7 unit per kilogram and 40% of insulin was given in basal rate and 60% as boluses. Average HbA1c in sixth month of life was 6.8%. One patient with TNDM after few weeks finished therapy. In children with DM1 treatment with CSII was started average in 9th month and TDI was 0.7 unit per kilogram and 30–40% of insulin was given in basal rate and 60–70% as a bolus. Two patients with PNDM with diagnosed mutation in Kir6.2 was transfered to sulfonylourea successfully.

Conclusions: (i) In infants with diabetes diagnosed in first 3 months of life most of TDI given in CSII is a basal rate and in those with diagnosis after third month of life most of TDI is given as boluses.

(ii) In children with diabetes diagnosed in the neonatal period and infancy CSII therapy with personal insulin pump is safe and effective method of treatment and allows for normal psychomotor development and correct metabolic control.

P-188-181

Could clinical parameters at initiation of continuous glucose monitoring (CGM) predict efficacy on HbA1c in type 1 diabetes (T1D) pediatric patients at 3 months? Preliminary results in a prospective study of 141 patients (Start-In!)

S. Guilmin-Crépon[1,2], E. Scornet[2], N. Couque[3], V. Sulmont[4], A.-S. Salmon[5], C. Le Tallec[6], R. Coutant[7], F. Dalla-Vale[8], C. Stuckens[9], H. Bony[10], H. Crosnier[11], F. Kurtz[12], J.-C. Carel[1], C. Alberti[2] & N. Tubiana-Rufi[1]

[1]*Robert Debre Hospital, APHP, Pediatric Endocrinology and Diabetology, Paris, France;* [2]*Robert Debre Hospital, APHP, Clinical Research Unit, Paris, France;* [3]*Robert Debre Hospital, APHP, Hormonology, Paris, France;* [4]*Hopital Alpes Leman, Diabetology, Annemasse, France;* [5]*American Memorial Hospital, CHU, Pediatric Unit, Reims, France;* [6]*CHU Hopital des Enfants, Pediatric Diabetology, Toulouse, France;* [7]*CHU, Pediatric Endocrinology and Diabetology, Angers, France;* [8]*CHU Hopital Arnaud de Villeneuve, Pediatric Unit, Montpellier, France;* [9]*CHU Hopital Jeanne de Flandre, Pediatric Unit, Lille, France;* [10]*CHU Hopital Nord, Pediatric Unit, Amiens, France;* [11]*CHI, Pediatric Unit, Poissy, France;* [12]*CHI, Pediatric Unit, Saint-Avold, France*

Objective: To evaluate whether clinical factors at initiation are associated with HbA1c benefit of CGM at 3 months in T1D children and adolescents.

Methods: Subjects with inadequate control (HbA1c >7.5%) despite intensive insulin therapy were enrolled in a larger 1 year multicenter pediatric prospective study (Start-In!) using real time CGM (Paradigm Veo Medtronic®) continuously during 3 months. Clinical, biological, socio-psychological factors at inclusion and treatment modalities were analyzed according to 2 groups considering the reduction in HbA1c: over 0.2% at 3 months (G1) or not (G2).

Results: Among 141 subjects (median age 12.2 years (3.5–17.9), duration of T1D 6.3 years (0.9–14.2), 75.5% on pump, mean baseline HbA1c 8.45% (7.5–10.7)), 42% improved their A1c at 3 months : G1, $n = 59$; median reduction -0.7% (-2.5 to -0.3) vs G2, $n = 82$; +0.3% (-0.2 to 2.1). In a multivariate analysis, higher HbA1c level at initiation ($P < 0.0001$) and longer duration of T1D (p 0.002) are significantly associated with improvement in HbA1c at 3 months. Moreover, rate of sensor use (defined as total time with sensor glucose values over study time) was not predictive of HbA1c change. However, the subjects had a particularly good adherence, the median time of port being 80%.

Conclusion: In this preliminary analysis of a larger prospective study (Start-In!), baseline HbA1c and T1D duration are predictive of improvement in HbA1c at 3 months of CGM use in children and adolescents. These results will be supplemented by reassessment at long term and others factors in terms of appropriation and use of the CGM device by the patient/parent or as clinical parameters like hypoglycemia, glycemic variability and satisfaction or quality of life.

P-388-182

Continuous subcutaneous insulin infusion started in children under 2 years of age

L. Groele[1], M. Lipka[2], H. Trippenbach-Dulska[2], M. Procner-Czaplinska[2], J. Sendela[2], A. Ramotowska[2], K. Dżygało[2] & A. Szypowska[2]

[1]*Medical University of Warsaw, Paediatric, Warsaw, Poland;* [2]*Medical University of Warsaw, Warsaw, Poland*

Background: Infants and toddlers with type 1 diabetes (T1D) are the group of children which present a unique set of problems to the health care professionals and to their families. The aim of this study was to analyze the management of diabetic children under 2 years of age.

Methods: Medical charts of 50 children below 2 years of age at continuous subcutaneous insulin infusion (CSII) initiation were examined retrospectively. All children were started with CSII within 6 month after diabetes onset and received pump therapy for at least 1 year (from 1 to 4 years). Every 3 months, weight, height, glycated haemoglobin (HbA1c), total daily insulin dose (TDD), basal insulin dose, the frequency of severe hypoglycaemia (SH) and ketoacidosis (DKA) were registered. The basal insulin pattern and insulin-to-carbohydrate ratio were collected at the insulin pump initiation after stabilization of glycemic control.
Results: There was no statistically significant difference between the annual average HbA1c during the follow-up 6.9 ± 0.7% vs 6.9 ± 0.7% vs 7.1 ± 0.9% vs 7.3 ± 0.8% P = 0.184. The daily insulin requirement increased from 0.7 to 0.8 IU/kg/day during the follow-up P = 0.008. The average basal insulin rate did not exceed 30% of TDD. The basal rate at CSII implementation was programmed in hourly intervals from 0 to 0.2 IU/hour (average: 0.07 IU/hour). The mean insulin-to-carbohydrate ratio was higher at breakfast than at other meals 0.8 (range 0.3–1) vs 0.4 (range 0.1–0.5) units/10 g of carbohydrates, respectively. There was no statistical difference in BMI SD scores during a 4-years follow-up period. Two incidences of DKA and 4 incidences of SH were observed/reported.
Conclusion: CSII is a safe and effective method of management of the youngest diabetic children. Therefore it should be presented as a choice of treatment for children under 2 years of age with newly recognized T1D.

P-447-183

Usefulness of CGM with iPro2 in children with T1DM and correlations between Glucose Variability and metabolic control

S. Zucchini[1], M. Scipione[1], B. Predieri[2], L. Iughetti[2], C. Balsamo[1], A. Rollo[1], P. Bruzzi[2], E. Molinari[3], P. Di Stefano[3] & G. Maltoni[1]
[1]*S.Orsola Malpighi Hospital, Department of Pediatrics, Bologna, Italy;* [2]*University of Modena and Reggio Emilia, Department of Pediatrics, Modena, Italy;* [3]*Medtronic, Inc., Sesto S.Giovanni, Italy*

Objectives: Primary aim of the study was to evaluate the effect of a single iPro2 CGM on 3-months. HbA1c. Secondary aims were the feasibility of iPro2 monitoring and the evaluation of different metabolic and risk indexes.
Methods: Seventy pts with T1DM (age 13.8 ± 4.6 years, T1DM duration 7.4 ± 3.6 years, HbA1c 8.4% ± 1.3) treated with three different insulin regimens (three inj of premix ins. $n = 6$, MDI $n = 45$, CSII $n = 19$) wore iPro2 for 6 days. iPro2 was applied in pts with HbA1c >7% (n.59) despite optimized therapy, or with recurrent hypoglycemia and HbA1c <7% (n.11). HbA1c was tested before and 3 months. after CGM data were used for glucose variability (GV) indexes calculation (CV, Conga, MAGE, MODD, AUC) and glycemic risk (GR) assessment (LBGI, HBGI, BGRI, J index, ADRR and BG Rate). LBGI and HBGI were also tested for correlation with baseline (BL) parameters (HbA1c, age, BMI, pubertal stage, disease duration, therapeutic regimen).
Results: No pts reported significant side effects. Three-month HbA1c decreased to 8.0% ± 1.0 (P = 0.04). In the pts with HbA1c >7% (n.51) HbA1c decreased from 8.8% ± 1.2 to 8.3% ± 0.94 (P = 0.008), while in the pts with HbA1c <7% (n.12) was unchanged 6.5% ± 0.4 of 6.7% ± 0.4 (NS). HBGI and LBGI didn't significantly correlate with any BL parameter both in the univariate and multivariate logistic regression analysis. GV indexes were evaluated in pts with HbA1c increasing ($n = 23$, from 7.6 ± 1.1 to 8.1 ± 1.2) and decreasing ($n = 47$, from 8.8 ± 1.3 to 7.9 ± 0.9) founding no differences. Furthermore no significant differences were found between the therapy groups in GV indexes.
Conclusions: iPro2 is feasible in pediatric patients and was helpful in improving HbA1c especially in patients with suboptimal glicemic control. No significant correlation was found between BL characteristics of pts and GR indexes (HBGI and LBGI). Since no significant difference was found considering HbA1c increasing and decreasing trend, it is confirmed the independent value of GV indexes in the assessment of metabolic control.

P-503-184

Insulin pump therapy protects children with type 1 diabetes agains endothelial dysfunction

A. Scaramuzza[1], F. Redaelli[1], L. De Angelis[1], V. Giudici[1], E. Giani[1], V. Comaschi[1], M. Cavallini[1], M. Macedoni[1], S. Ungheri[1], M. Ferrari[1] & G.V. Zuccotti[1]
[1]*University of Milano - Luigi Sacco Hospital, Pediatrics, Milano, Italy*

Objective: We evaluated the prevalence of endothelial dysfunction as measured by mean of reactive hyperemia-peripheral artery tonometry (RH-PAT) in children and adolescents with type 1 diabetes (T1D).
Materials and methods: Forty-three children and adolescents (27 males) with T1D, ages 10–23 years. (mean ± SD: 15.3 ± 3.5 years), duration of diabetes 8.9 ± 4.3 years (range 1–20 years), using either MDI or CSII, underwent RH-PAT endothelial function testing (EndoPAT2000™, Itamar Medical, Israel) after an overnight fast. Height, weight, BMI, blood pressure (BP), fasting lipid profile, HbA1c, insulin requirement, physical exercise (hour/week), microangiopathic complications, dietary habits and body composition were determined in each child.
Results: We observed endothelial dysfunction in 33 patients with T1D as evidenced by lower mean RH-PAT scores (1.31 ± 0.18 vs 2.04 ± 0.41, P < 0.0001), showing higher HbA1c values (8.45 ± 1.23% vs 7.56 ± 0.54%, P = 0.032). According to therapy (CSII vs MDI), HbA1c was still higher in patients with endothelial dysfunction (CSII $n = 35$, 8.38 ± 1.13 vs 7.50 ± 0.59%, P = 0.047; MDI $n = 8$, 8.78 ± 1.70% vs 7.80 ± 0.35% vs P = NS, respectively). Variations in RH-PAT score were not explained by differences in insulin requirement, BMI, systolic BP, diastolic BP, lipids, microalbuminuria, dietary habits or body composition. However a higher percentage of patients with impaired endothelial function showed abnormal cardiac autonomic tests ((P = 0.002) and were more sedentary (less than 4 hour/week of physical exercise) (P < 0.0001), than patients with normal endothelial function.
Conclusion: Children and adolescent with T1D and mean diabetes duration of 9 years displayed evidence of endothelial dysfunction. However good metabolic control (HbA1c ≤7.5%) and regular physical activity (at least 4 hour/week) might play a protecting role.

Poster Tour 3 - Pumps and Sensors

P-310-185

The effect of low glycemic index (GI) diet on blood glucose levels among children and adolescents with T1DM on insulin pump therapy and continuous glucose monitoring

F. Ismail[1] & Z. Rahme[1]
[1]*Dasman Diabetes Institute, Nutrition Department, Kuwait, Kuwait*

Objectives: The aim of this study is to evaluate the effect of low GI diets on postprandial blood glucose (BG) on children and adolescents (age 7–17 years old) with T1DM on insulin pump therapy associated with Continuous Glucose Monitoring (CGM) and to compare the results to a three-day analysis of their regular diets. Also, to identify whether a three-day low GI diet will be accepted and adhered to by the participants.
Methods: The health care team (RD and DNE) recruited a total of 10 participants with T1DM on pump therapy and CGM to apply and implement a low GI diet for three consecutive days and advised the participants to consume their regular meals for 3 days after consuming their low GI diets. Follow up visits were conducted after 1 week to download their CGM.
Results: Data from insulin pump downloads and questionnaires were analyzed. Results demonstrated no major effect on postprandial BG when low GI diets were consumed. However, the mean pre-prandial BG before consuming their low GI meals for breakfast, lunch and dinner were controlled (7, 8 and 6 mmol/l) compared to their pre-prandial BG during their regular diets, which were always high (11,12 and 10 mmol/l). There was a significant impact on pre-prandial BG ($P \leq 0.05$). Another outcome of interest was area under the curve (AUC). Analysis comparing AUC >7.8 with low GI diet and without showed that the duration of hyperglycemia with low GI diet was for 2 hours compared to the duration of hyperglycemia during their normal intake which lasted for 3 hours. All Participants found the low GI diet is burdensome.
Conclusion: This study was the first of its kind of to evaluate the effects of low GI on BG levels among children and adolescents with T1DM in the State of Kuwait. This study demonstrated a positive effect on pre meal BG as well as a reduction of length of exposure to high BG. Further studies (larger sample size and longer duration) should be undertaken to examine the effect of GI foods on pre-prandial BG.

Health care team sharing the CGM download results.
Photo Title: Health care team in the Pedatric Unit sharing the CGM download results with one of the participants

P-470-186

Effect of continuous subcutaneous insulin infusion (CSII) on glycaemic control (HbA1c), weight, and body mass Index (BMI) in children with type 1 diabetes diabetes mellitus (TIDM)

A. Rafiq[1], N. Abdullah[1] & V. Puthi[1]
[1]*Peterborough City Hospital, Paediatrics, Peterborough, UK*

Background: The incidence of TIDM is rising, especially in the younger children. The duration of diabetes has major impact on moratlity and morbidity and reduces the life span of the individual. The Diabetes control and complication trial (DCCT) and follow up study Epidemiology of Diabetes Intervention and complication trial (EDIC) are convincing that intensive control of blood sugar prevents long term complications. Subsequently intensive therapies such as basal bolus regime and continuous subcutaneous infusion therapy (CSII) are finding increasing acceptance.
Methods: Eight year retrospective study of patients with TIDM on CSII in a district general hospital with 180 patients with paediatric diabetes. Data was collected 2 years prior to and after commencing CSII on dose of insulin, BMI, HBA1C, Age at diagnosis and duration of Diabetes.
Results: The use of CSII has increased dramatically in these 8 years from 15 patients in 2004 to almost 70 patients in 2012. 51 patients (27 males) were enrolled in the study as all the data was available on the variables. The mean age at diagnosis was 6.2 year (range: 1–15 years) and half of the patients were diagnosed under the age of 5 years. CSII therapy was commenced at mean age of 10.3 years (range: 3–17 years). Overall HbA1c improved by mean of 1.1%, with better improvement in older patients than younger patients (1.8% vs 1.4%). The average daily dose of Insulin reduced by 12.5%, however the average BMI increased from 18.8 prior to CSII to 20.7, and this weight gain was persistent for 2 years.
Conclusions: Intensive management of TIDM by CSII is beneficial with better glycaemic control and improved quality of life. However CSII is predisposing patients to increasing weight gain on a backdrop of current epidemic of childhood obesity. We conclude that patient on CSII therapy should be warned about increasing weight gain on CSII and should have regular dietary assessment in addition to monitoring the glycaemic control.

P-343-187

Experience of a minimum short class (a short class covering the basics) for insulin pump therapy initiation at our out-patient clinic: 185 type 1 diabetes cases

Y. Kashihara[1], T. Kawamura[1], M. Hirose[1], K. Watanabe[1], T. Hashimoto[1], T. Higashide[1], K. Kimura[2], H. Inada[3], S. Niihira[3], S. Aono[4] & H. Shintaku[1]
[1]*Osaka City University Graduate School of Medicine, Pediatrics, Osaka, Japan;* [2]*Kimura Clinic, Osaka, Japan;* [3]*Health Service Bureau of Osaka-city, Osaka, Japan;* [4]*Teradacho Kids Clinic, Osaka, Japan*

Background: Insulin pump therapy has recently been popular among Type 1 diabetes patients (T1D). However, compared with other countries, a prevalence rate of pump therapy in Japan is still below 5%. One reason why pump therapy is not yet popular is that most Japanese institutions require patients to be hospitalized at the initialization of the therapy out of fears of increased hypoglycemia. We have introduced insulin pump therapy to 240 T1D patients. 185 patients were trained at an out-

patient clinic through a short class covering the basics of the therapy (minimum short class).The objective is to determine the effect and safety of our minimum short class for pump initiation to T1D out-patients.
Method: We reviewed the clinical data, such as HbA1c, insulin dose, and adverse events of 185 patients who were introduced pump at our out-patient clinic and continued pump therapy for more than 3 years.
Result: A minimum short class for pump introduction to the out-patients was carried out by pediatric diabetes specialists. Each class took about 1.5–2 hours. The average age was 14.3 years old. The number of patients who continued pump therapy for more than 3 years was 105. The average HbA1c at the start, 1 year, and 3 year marks, were 8.3, 7.6, and 7.8%, respectively. The total daily insulin dose per weight was 1.0, 0.85, and 0.87; the basic insulin dose was 0.33, 0.34, and 0.35. Episodes of severe hypoglycemia decreased from 20 to 3 per 100 persons a year. During the observation period of 10 years from March 2002 to April 2012, we have had no episodes of severe hypoglycemia between the initiation of pump therapy with the minimum short class and the follow-up visit 1 month later. The major reason for discontinuation was the psychological feeling of being ''attached''.
Conclusion: The minimum short class for pump initiation for T1D outpatients can be carried out both safely and effectively. This method may help the spread the pump therapy to T1D in Japan.

P-129-188

Is good knowledge of carbohydrates and numeracy before starting continuous glucose measurement a criteria for succesful treatment?

T. Lappenschaar[1] & DIABSense
[1]*Diabeter National Diabetes Centre, Diabeter-Oost, Deventer, Netherlands*

Objective: The aim of this study is to evaluate carbohydrates knowledge and numeracy, how these skills influence glycaemic control and how they can be imporved in children and teens with type I diabetes before they start sensor augmented pumptherapy (SAP).
Design: 150 adolescents and young adults with type 1 diabetes as well as parents of a child with type 1 diabetes with an insulin pump and with adequate glycaemic control, HbA1c <8.5% (69 mmol/l) participated. A specialized dietician interpretated their baseline knowledge as poor, moderate and good dietairy knowledge. Subsequently, they were asked to completed a questionaire about their foodhabits, carbohydrates countingskills, numeracy, ability to read and use labels and bolustiming before starting SAP. When questionnaire-scores were inadequate they followed an extra training by the dietitian. After 6 months SAP the questionairy was repeated.
Setting: Secondary and tertiary diabetescare center in the Netherlands. Preliminary results: before starting SAP 53% of the participants scored good in dietary knowledge and estimating carbohydrates. The other 47% of the participants with a moderate or low knowledge level followed additional training by the dietitian. Nonparametric testing showed a moderate correlation coefficient between carbohydrate knowledge with HbA1c (-1.96, $P = 0.017$), and a strong correlation between the consult interpretation with carbohydrate knowledge (0.493, $P < 0.001$) and HbA1c (-2.99, $P = 0.001$).
Conclusion: This study confirms that a moderate knowledge on carbohydrates corresponds with a decreased glycemic control. Retrospective data on consults with a dietician, also showed that patients with a limited knowledge interpretated by the dietician also had a moderate carbohydrate score and a decreased glycemic control. Adequate knowledge on dietary issues can be monitored and measured. Using such a measure and training is likely to improve SAP treatment.

P-306-189

Quality of life and HbA1c outcomes in children and young people commencing insulin pump therapy

J.A. Cropper[1,2], M. Ford-Adams[2], A. Hulse[1], E. Barker[1] & L.K. Parthasarathy[2]
[1]*Guy's and St Thomas' NHS Trust, London, UK;* [2]*King's College NHS Trust, London, UK*

Objectives: To determine the impact on quality of life and metabolic control of commencement of insulin pump therapy in a cohort of children and young people attending two hospitals in south London.
Methods: Seventeen children and young people with Type 1 diabetes aged 5 to 17 undergoing assessment for pump therapy were routinely seen by a clinical psychologist as part of a wider assessment process. The majority of these young people were in the 13–17 age group. Measures quantifying quality of life (PEDS-QL generic and diabetes specific modules) were administered to both parent and child, prior to and six months following commencement of pump therapy. The two London boroughs in which the hospitals are situated have high levels of socio-economic deprivation, both are in the top 5% areas of deprivation in England (Lesser, 2010).
Results: Both parents and children reported an increase in quality of life after starting on a pump in both the diabetes specific and generic measures (mean score on the diabetes module for parents: 364–392; for young people: 378–400). Correlational analysis showed a statistically significant increase in quality of life for parents on the diabetes specific measure ($r = 0.647$, $P = 0.005$). HbA1c results showed a statistically significant improvement pre to post pump start from a mean of 9.07 to 8.28 ($X_2 = 0.755$, $P < 0.001$).
Conclusions: Initial findings from this population suggest that insulin pump therapy improves both young person and parent rated quality of life. This is an important outcome and is highly valued by families and young people themselves. In addition overall blood glucose control significantly improved. These findings are particularly pertinent in the context of the high levels of socio-economic deprivation in this area. This cohort of young people has been shown to be particularly hard to reach and often have high Hba1c. It is therefore very encouraging that insulin pump therapy has been seen to be successful here.

P-328-190

Accuracy of the Enlite and Sof-sensor glucose sensors in children with type 1 diabetes

J.J. Shin[1], S. Huang[1], S.W. Lee[1], B. Janowski[1] & F.R. Kaufman[1]
[1]*Medtronic, Inc., Northridge, USA*

Objectives: An analysis of sensor accuracy in Enlite versus Sof-sensor glucose sensors using the Guardian REAL-Time calibration algorithm was conducted in children with type 1 diabetes.
Methods: Both studies were single-sample correlational design without controls. In the Sof-sensor study, all subjects (age 7–17, $n = 61$) wore a Guardian RT System for ~6 days. Two sensors were worn in the abdomen, each for 3 days, for a total of 6 days of sensor wear. Subjects tested their capillary blood glucose level ≥7 times/day with a OneTouch Ultra meter. Subjects were instructed to calibrate the sensor 3–5 times per day. In the enlite study, all subjects (age 7–17, $n = 83$) wore the Guardian REAL-Time Display devices using the MiniLink transmitter over two

7-day periods. During each 7-day period, an Enlite sensor was placed in the abdomen or buttock and attached to a MiniLink transmitter. Subjects were instructed to test their capillary blood glucose level 4 times/day with a OneTouch UltraLink meter. Subjects were instructed to calibrate the sensor 4 times/day.
Results: The Enlite sensor demonstrated improved overall accuracy compared to the Sof-sensor in pediatric patients with type 1 diabetes. The Table gives sensor accuracy at different meter glucose concentration ranges. Lower numbers indicate better accuracy.
Conclusions: With its improved overall accuracy, the Enlite sensor may help to expedite semi-automated insulin delivery features in children.

Table: Enlite and sof-sensor accuracy by glucose range.

Reference range	Enlite (MARD, %)*	Sof-sensor (MARD, %)*
40–80 mg/dl	16.5 ± 13.1	22.9 ± 18.0
>80–120 mg/dl	18.5 ± 17.0	21.7 ± 22.7
>120–240 mg/dl	15.1 ± 13.7	14.4 ± 12.2
>240–400 mg/dl	12.6 ± 11.5	14.6 ± 11.6
All 40–400 mg/dl	16.2 ± 15.4	19.0 ± 19.8

P-144-191

A case of extreme subcutaneous insulin resistance otherwise than by pump at the child

G. Mounia[1,2], M. Naceur[2], S. Niar[2], A. Zennaki[2], M. Bessahraoui[2] & M. Touhami[2]
[1]*Regional Military University Hospital of Oran, Oran, Algeria;* [2]*Clinique A. Cabral, Oran, Algeria*

Diabetes mellitus with resistance to insulin administered subcutaneously or intramuscularly (DRIASM) is a rare syndrome.
Objective: This study was to report a case of DRIASM in the child.
Methods: Mokhtaria is 10 years old, she's admitted for not reducible hyperglycemia for 5 months. Parents not consanguineous and a 8 years old brother, are healthy. The hyperglycemia was discovered without polyuria, polydipsia or loss of weight.
Results: In spite of insulin therapy with increasing doses, it persist very high glycemia between 3 and more than 6 g/l. She has a good general status, normal clinical examination, in particular no dysmorphy. Her glycemia was 5 g/l, glucosuria at 3^+, acetonuria at 2^+ and HbA1c 13.2%. After insulinotherapy with autopulsed syringe at 0.1 U/kg/hour, the normoglycemia was reached in only 5 hours. Under basal/bolus regimen (more than 2 U/kg/24 hour) the glycemia remains very high with important glucosuria without acetonuria or polyuria. The intramuscular insulin was tried with doses above than 4 U/kg/24 hour in six injections without result. The bolus IV insulin remains ineffective but its intravenous saline fluid drip normalized the glycemia. The intra-peritoneal infusions by an external pump (Medtronic, Paradigm Real Time) involve a fast and long-lasting normalization of the glycemia with less of 1 U/kg/24 hour. Finally, in subcutaneous pump, with insulin doses not exceeding 1.5 U/kg/24 hour, diabetes control is maintained. The genetic and biochemical exploration confirm the DT1 diagnostic. Mokhtaria is at present under subcutaneous pump with a very satisfactory diabetes control.
Conclusion: It's about the only case of subcutaneous insulin resistance excepted the insulin pump, in a child without syndrom.

P-537-192

Is continuous subcutaneous insulin infusion (b) beneficial in type 1 diabetes mellitus (T1DM)

H. Ambulkar[1], S. Ahmed[1] & A. Gupta[1]
[1]*Darent Valley Hospital, Paediatrics, Dartford, UK*

Objective: To see the effectiveness of CSII in children with T1DM.
Method: A retrospective study in T1DM who were on CSII. Total of 16 children on CSII, age range of 2–17 years; three were excluded from the study due to insufficient data. Four were girls and nine were boys. A serial data on each patient about their HbA1c, Body Mass Index (BMI), hospital attendance due to significant hypoglycaemia and DKA was recorded. These data were from two review appointments before the start of CSII and two review appointments after the start of CSII. The most of the data were within 6 months of either side of start of CSII. A computerised Diabetes Database was used to obtain this data. Patients and their parents were also interviewed informally about their satisfaction with CSII during their review appointments.
Results: Improved mean HbA1c in 84.6% of the patients within 6 months of CSII. Mean HbA1c 6 months before CSII was 8.67% (range of 6.6–9.4 with SD 0.87) as oppose to 7.91%, (range of 6.3–9.1% with SD 0.91) within 6 months of CSII ($P = 0.00237$). Increased mean BMI in 84.6% of the patients within 6 months of CSII. Mean BMI before CSII was 18.66 kg/m^2 (SD 2.67) as oppose to 19.6 kg/m^2 (SD 3.21) within 6 months of CSII ($P = 0.00251$). Five episodes of significant hypoglycaemia and one case of DKA occurred before CSII as compared to only one case of hypoglycemia afterwards (80% reduction). All the subjects were satisfied with CSII and a formal survey of patient satisfaction has undergone. All but one patient (93%) continued with CSII.
Conclusion: CSII resulted in significant improvement in glycaemic control and in decreasing significant hypoglycaemia in T1DM. A significant increase in BMI after being on CSII was noted which might be suggesting that it allows liberalisation of caloric intake in these patients.

Poster Tour 1- New Insulins and Pharmacologic Agents

P-170-193

Exendin-4 inhibits iNOS expression at the protein level in LPS-stimulated Raw264.7 macrophage by the activation of cAMP/PKA pathway

S.-Y. Chang[1], D.-B. Kim[2], S.-H. Ko[2], Y.-H. Jo[1] & M.-J. Kim[1]
[1]*The Catholic University of Korea, Department of Physiology, Seoul, Korea, Republic of;* [2]*The Catholic University of Korea, Department of Internal Medicine, Seoul, Korea, Republic of*

Objectives: Glucagon-like peptide-1 (GLP-1) and its potent agonists have been widely studied in pancreatic islet b-cells. However, GLP-1 receptors are present in many extrapancreatic tissues including macrophages, and thus GLP-1 may have diverse actions on these tissues and cells. Therefore, we examined the mechanism by which exendin-4 (EX-4), a potent GLP-1 receptor agonist, inhibits lipopolysaccharide (LPS)-induced iNOS expression in Raw264.7 macrophage cells.
Methods: The expression of iNOS, p-IκBα and p65 were detected by Western blot analysis and content of nitrite was measured using Griess reagent. Additionally, iNOS mRNA expression and promoter activity were observed by Northern blot analysis and luciferase assay, respectively. To observe the stability of iNOS mRNA and protein, actinomycin D chase and cycloheximide chase studies were performed, respectively. Also, we examined iNOS protein expression using adenylate cyclase inhibitor, PKA inhibitor and PKA gene silencing.
Results: EX-4 significantly inhibited LPS-induced iNOS protein expression and nitrite production. However, EX-4 did not inhibit LPS-induced iNOS mRNA expression and iNOS promoter activity. Consistent with the result of iNOS promoter, LPS-induced IκBα phosphorylation and nuclear translocation of p65 were not inhibited by EX-4. Also, actinomycin D chase study and reporter study using iNOS mRNA 3′-UTR showed that EX-4 did not affect iNOS mRNA stability. Meanwhile, cycloheximide chase study demonstrated that EX-4 significantly accelerated iNOS protein degradation. The EX-4 inhibition of LPS-induced iNOS protein was significantly reversed by adenylate cyclase inhibitors (MDL-12330A and SQ 22536), PKA inhibitor and PKAα gene silencing.
Conclusions: These findings suggest that EX-4 inhibited LPS-induced iNOS expression at protein level, but not at transcriptional and posttranscriptional levels and this inhibitory effect of EX-4 was mainly dependent on cAMP/PKA system.

P-172-194

Hexane fraction of citrus aurantium L. induces membrane depolarization and increases glucagon-like peptide-1 (GLP-1) secretion in NCI-H716 cells

E.-K. Choi[1], H.J. Yang[1], M.-H. Shin[1], K.-S. Kim[1], K.S. Ahn[1], S.G. Lee[1], J.H. Lee[1], D.W. Nam[1], W.S. Jung[1] & H.-J. Jang[1]
[1]*College of Oriental Medicine, Kyung Hee University, Seoul, Korea, Republic of*

Objects: Because the glucagon-like peptide-1 (GLP-1) stimulates insulin secretion, the research about induction of GLP-1 secretion is certainly worth. *Citrus* species have been used traditionally as a medicinal herb in oriental pharmacology. Here, we reported on the anti-diabetic function of *Citrus aurantium* L. (CA).
Methods: We carried out a series of experiments to demonstrate the functions of HFCA against diabetes mellitus at the molecular level. Four fractions of CA were used in a GLP-1 assay. The GLP-1 ELISA assay was performed to measure the concentrations of GLP-1 after treatment with the four fractions of CA. The hexane fraction showed the best results and was chosen for the microarray analysis in the genome wide analysis.
Results: According to the GLP-1 assay, hexane fraction of CA (HFCA) stands out clearly from other three fractions for GLP-1 secretion. Therefore we chose HFCA for the microarray analysis. Through the analysis, it was found that voltage-gated potassium (Kv) channels drove membrane depolarization and then influenced Ca^{2+} currents in NCI-H716 cells.
Conclusions: HFCA induces GLP-1 secretion in human enteroendocrine cell, NCI-H716. And microarray analysis presents NCI-H716 cell undergo a membrane depolarization. It may be suggested that HFCA is able to induce the secretion of GLP-1 from the cells through a depolarization via the voltage-gated potassium (Kv) channel and the transition of Ca^{2+} influx. These results suggest this is a new oriental herbal drug that has proven effects for the remedy of type II diabetes mellitus.
Keywords: *Citrus aurantium* L. (CA), glucagon-like peptide-1 (GLP-1), enteroendocrine cell, type II diabetes mellitus, oriental herbal medicine.

P-173-195

Gentiana scabra extracts activates G protein-coupled receptor pathway that stimulates glucagon-like peptide-1 secretion

H.J. Yang[1], M.-H. Shin[1], K.-S. Kim[1], E.-K. Choi[1], K.S. Ahn[1], S.G. Lee[1], J.H. Lee[1] & H.-J. Jang[1]
[1]*College of Oriental Medicine, Kyung Hee University, Seoul, Korea, Republic of*

Objects: Glucagon-like peptide-1 (GLP-1) which secreted by enteroendocrine L cell have been issued as a therapeutic agent for type II diabetes mellitus, because of its function to stimulate insulin secretion in pancreatic β-cells. *Gentiana scabra* (GS) is one of the bitter tasting herbal medicines which have been used in traditional oriental medicine to treat the diabetes mellitus. This study shows the GLP-1 secretion of the enteroendocrine L cell stimulated by stimulation of GS extractions through GPCR pathway.
Methods: To examine the molecular mode-of-action, GLP-1 ELISA and microarray was performed. After 2 days differentiation and overnight starvation, the cells were treated ethylacetate fraction of GS for 1 hour. The supernatant that has secreted GLP-1 was used in GLP-1 ELISA. As the same following process, total RNA were extracted and used in microarray.
Results: The etylacetate fraction of GS conspicuously stimulated secretion of GLP-1 in lower concentration. According to microarray analysis, GS influences GPCR signaling pathway specifically. And GS induced down-regulation of voltage-gated potassium channels that means change intracellular electrical signal.
Conclusions: This study provides the understanding the possibility of GS used as a therapeutic herbal medicine for the type II diabetes. Especially, the result demonstrates the etylacetate fraction of GS induces GLP-1 secretion in NCI-H716 cells through the GPCR signaling pathway.

Keywords: *Gentiana scabra* (GS), Glucagon-like peptide-1 (GLP-1), NCI-H716, Type II diabetes mellitus, herbal medicine.

P-471-196

The impact of insulin glulisine in comparison with aspart on postprandial glycaemia after the high-glycaemic index meal in children with type 1 diabetes - cross-over study

K. Dżygało[1] & A. Szypowska[2]
[1]*Medical University of Warsaw, Department of Pediatrics, Warsaw, Poland;* [2]*Medical University of Warsaw, Warsaw, Poland*

Objectives: Some studies have suggested that insulin glulisine (GLU) has a slightly faster onset of action compared with insulin aspart (ASP). Meals of high glycaemic index (H-GI) have distinct effect on postprandial glycaemia (PPG). The aim of this study was to assess the differences in action of two insulins: GLU and ASP after the H-GI meal in T1DM children treated with insulin pump.
Methods: We performed a randomised, double-blind, two-way crossover study. There were 53 children included, aged 10.5–17.9 years (mean 14.8; SD 2.1), 26 boys and 27 girls with diabetes duration longer than one year (1–13.5 years; mean 5.3; SD 3.3), mean HbA1c 8.7% (6.0–16.3; SD 1.9). Subjects were allocated to one of two treatment orders - group A: GLU-ASP and group B: ASP-GLU. The patients had H-GI breakfast for two subsequent days. Primary outcome was postprandial glycaemia based on continuous glucose monitoring system and self blood glucose control assessed after 30, 60, 90, 120 and 180 minutes after the meal bolus. Secondary outcome was the frequency of hypoglycemia (<60 mg/dl).
Results: There were no significant differences in PPG between the groups in each time-interval. Mean glycaemia GLU vs ASP at start was 110.8 vs 109.5 (P = 0.7031); 30 min. 127.5 vs 125.5 (P = 0.7314); 60 min. 172.7 vs 173.3 (P = 0.9435); 90 min. 191.2 vs 182.4 (P = 0.3887); 120 min. 174.2 vs 169.6 (P = 0.5989); 180 min. 120.5 vs 114.6 (P = 0.5564). Seven patients in both groups had hypoglycaemia. Most of episodes was observed after 2 hours.

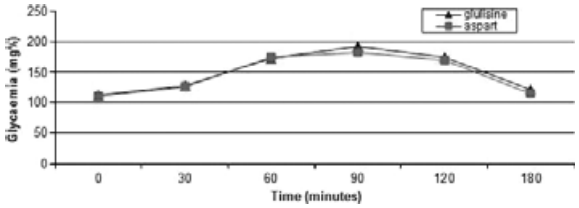


Fig.1 Six-Point glucose curve

Conclusion: We did not demonstrate the superiority of insulin glulisine over aspart on postprandial glycaemia of high glycemic index meals. In both groups similar blood glucose fluctuations were observed (hyper- and hypoglycaemia).

P-156-197

Anti-diabetic effects of aqueous extract of Pterocarpus marsupium Roxb. on plasma blood glucose (12 hour fasting) and HbA1c, in adolescents (11–19 years) with type 2 diabetes

M. Jain[1,2], P. Kumar[3], A. Chowdhry[4] & D. Bhalla[1]
[1]*Aayyuskaam Diabetic Foundaation, New Delhi, India;* [2]*Aaayyuskaam Holistic Clinic, New Delhi, India;* [3]*Jawaharlal Nehru University, School of Life Sciences, New Delhi, India;* [4]*Dr. B. R. Sur Homoeopathic Medical College Hospital and Research Centre, New Delhi, India*

Objectives: Indian adolescents (11–19 years) were diagnosed with Diabetes T2 on having high blood-plasma glucose (12 hour fasting) ≥140 mg/dl and HbA1c ≥6.5% (≥48 mmol/mol). In the present study, the positive anti-diabetic effects of *Pterocarpus marsupium Roxb.* aqueous extract administration has been studied on blood-plasma glucose (12 hour fasting) and HbA1c.
Methods: Using a cross-sectional design, plasma glucose (12 hour fasting) and glycosylated hemoglobin (HbA1c) were recorded for 75 diabetic T2 adolescents (subjects) between 11–19 years old at Aayyuskaam Holistic Clinic, New Delhi, India. Aqueous extract of *Pterocarpus marsupium Roxb.* (1 drop per kg Body divided equally in three parts for a day; mixed in 10 ml water [vehicle]) was administered 15–30 minutes before three major meals (breakfast, lunch & dinner) every day for 3–6 months. HbA1c test was repeated after every 12 weeks (3 months) and plasma glucose (12 hour fasting) test was repeated after every 7 days (once a week) for 3–6 months.
Results: Seventy nine (79%) percent of adolescent diabetic subjects had a fasting plasma glucose ≤170 mg/dl and thirteen (13%) percent were ≤200 mg/dl and eight (8%) percent were ≤150 mg/dl (P < 0.01). Promising positive effects of Pterocarpus *marsupium Roxb.*, as an anti-diabetic herb were observed. Good control on fasting blood-plasma glucose (P = 0.01) (decrease of 50–70 mg/dl plasma glucose). Significant reduction in HbA1c was also observed (P = 0.05).
Conclusions: Diabetes type 2 is common in Indian adolescents due to wrong life-style and genetic inclination toward metabolic syndrome. Aqueous extract of *Pterocarpus marsupium Roxb.* can be effectively used as an anti-diabetic herb. Hypoglycemic effects of herb were confirmed. More data in adolescents are needed to understand better health benefits of herb, in effectively countering diabetes.

P-17-198

Long-term effect of Trigonella foenum graecum and its combination with sodium orthovanadate in preventing histopathological and biochemical abnormalities in diabetic rat ocular tissues

P. Kumar[1], R.K. Kale[1] & N.Z. Baquer[1]
[1]*Jawaharlal Nehru University, School of Life Sciences, New Delhi, India*

Trigonella foenum graecum seed powder (TSP) and Sodium Orthovanadate (SOV) have been shown to demonstrate antidiabetic effects by stabilizing glucose homeostasis and carbohydrate metabolism in experimental type-1 diabetes. However their efficacy in controlling histopathological and biochemical abnormalities in ocular tissues associated with diabetic retinopathy is not known. The purpose of this study was to investigate the comparative efficacy of individual as well as combination therapy of TSP and SOV in 8 weeks diabetic rat lens and retina. Retinas and lenses were taken from control, alloxan-induced diabetic rats and diabetic rats treated separately with insulin, 5%TSP, SOV (0.6 mg/ml) and a combined dose of SOV (0.2 mg/ml) and 5%TSP for 60 days. Alterations in the activities of enzymes HK (hexokinase), AR (aldose reductase), SDH (sorbitol dehydrogenase), G-6-PD (glucose-6-phosphate dehydrogenase), GPx (glutathione peroxidase), GR (glutathione reductase) and levels of metabolites like sorbitol, fructose, glucose, MDA (malondialdehyde) and GSH (reduced glutathione) were measured. Blood glucose and polyol pathway enzymes AR and SDH increased significantly in diabetic rats. Animals treated with a combined dose of SOV and TSP had glucose levels almost comparable to controls, similar results were obtained in the activities of HK, G-6-PD, GPx and GR with histopathological events were effectively restored to control state in diabetic rat lens. In this study SOV and TSP effectively controlled ocular histopathological and biochemical abnormalities associated with

experimental type-1 diabetes, and a combination regimen of low dose of SOV with TSP demonstrated the most significant effect. In conclusion, the potential of SOV and TSP alone or in low dose combination may be considered as promising approaches for the prevention of diabetic retinopathy and other ocular disorders.

P-174-199

Anemarrhena asphodeloides Bunge, stimulates glucagon-like peptide-1 through G protein-coupled receptor signaling pathway in human enteroendocrine cells

K.-S. Kim[1], E.-K. Choi[1], K.I. Kim[1], D.H. Cho[1], H.R. Jang[1], H.J. Yang[1], M.-H. Shin[1], K.S. Ahn[1], S.G. Lee[1], J.H. Lee[1], S.-K. Jung[1], H.J. Jung[1] & H.-J. Jang[1]

[1]*College of Oriental Medicine, Kyung Hee University, Seoul, Korea, Republic of*

Object: The bitter taste receptors which found in human lingual taste system are also discovered in enteroendocrine cells and transfer the signals occurred by the bitter tastants via G protein-coupled signaling pathway to secrete GLP-1. In oriental medicines, bitter taste herbal medicines are often prescribed to treat the diabetes mellitus. Their effectiveness had been proven through the clinical studies, but the mechanisms are had not been studied at the molecular level. Here, we investigated the effectiveness of the bitter taste herbal medicine, *Anemarrhena asphodeloides* Bunge (AAB) on the type II diabetes mellitus.

Methods: To investigate the molecular pathway of the AAB on the secretion of GLP-1 in enteroendocrine NCI-H716 cells, pathway inhibition studies related to the G protein-coupled receptor signaling pathway were performed. We used five inhibitors to test where signaling moves; Gallein, U73122, Bis-indolylmaleimide, H-89, 2APB. To confirm G$\beta\gamma$-phospholipase C-inositol triphosphate (IP_3) pathway, we also performed calcium imaging experiment.

Results: Etylacetate fraction of AAB induces GLP-1 secretion in NCI-H716 cells via activation of G$\beta\gamma$-pathway, phospholipase C, protein kinase C, protein kinase A, intracellular calcium channel, and phosphodieserase. However, although blockade of every pathway known to be related the taste receptor pathway could not inhibited the secretion of GLP-1. In case of calcium imaging, gallein, U73122, and 2APB were block calcium influx of all.

Conclusions: This study demonstrates the molecular mechanisms of the bitter taste herbal medicine, *Anemarrhena asphodeloides* Bunge (AAB), on secretion of GLP-1 in enteroendocrine cells and, by extension, provides the evidence for theory of traditional Korean medicines through establish the bitter taste receptor theory.

P-16-200

Potential protective effects of Trigonella foenum graecum and sodium orthovanadate in hyperglycemia-induced alterations in cardiac membrane in alloxan diabetic rats

P. Kumar[1], R.K. Kale[1] & N.Z. Baquer[1]

[1]*Jawaharlal Nehru University, School of Life Sciences, New Delhi, India*

Objectives: Oxidative stress in diabetic tissues is accompanied by high level of free radicals and the simultaneously declined antioxidant enzymes status leading to cell membrane damage. In the present study, the effect of sodium orthovanadate (SOV) and *Trigonella foenum graecum* seed powder administration has been studied on blood glucose and insulin levels, membrane bound ATPases (Na^+K^+ATPase, Ca^{2+} ATPase), antioxidant enzymes (superoxide dismutase, glutathione S-transferases), lipid peroxidation, lipofuscin accumulations and distribution of glucose transporter (GLUT4) in heart of the alloxan induced diabetic rats and to see whether the treatment with SOV and *Trigonella* is capable of reversing these effects.

Methods: Diabetes was induced by administration of alloxan monohydrate (15 mg/100 g body weight) and female rats were treated with 2 IU insulin, 0.6 mg/ml SOV, 5% *Trigonella* in the diet and a combination of 0.2 mg/ml SOV with 5% *Trigonella* separately for 21 days.

Results: Diabetic rats showed hyperglycemia with almost four fold high blood glucose levels. Hyperglycemia increases lipid peroxidation and lipofuscin accumulations, causing decreased activities of membrane bound ATPases, antioxidant enzymes and GLUT4 expression with diabetes in the rat heart. Rats treated with combined dose of vanadate and *Trigonella* had glucose levels comparable to controls, similar results were obtained with the activities of antioxidant enzymes, membrane bound ATPases, lipofuscin, lipid peroxidation and GLUT4 in diabetic rats.

Conclusion: Our results showed that lower doses of vanadate (0.2 mg/ml) could be used in combination with *Trigonella* to effectively counter diabetic alterations without any toxic side effects.

P-381-208

The benefit of the use of bolus calculator and wireless communication between insulin pump and blood glucose meter in children with type 1 diabetes - randomized control trial

A. Ramotowska[1] & A. Szypowska[1]

[1]*Medical University of Warsaw, Warsaw, Poland*

Objective: In this RCT authors assessed whether the use of insulin pump bolus calculator reduces post prandial hyperglycaemia and results in better metabolic control compared to standard insulin calculation. Secondary question was if the wireless communication between devices: MiniMed insulin pump and blood glucose meter Contour Link, Bayer results in more frequent use of bolus calculator in type 1 diabetic patients.

Methods: 131 children (66 girls, 65 boys) with T1DM duration longer than one year were randomly assigned to the one of three groups: A- patients using bolus calculator wirelessly communicating with blood glucose meter, B- patients using bolus calculator without communication with blood glucose meter or C- control group.The mean age was 12.9 years (7–17, SD 2.8), mean diabetes duration 5 years years (1–14.2, SD 3.2), mean HbA1c 7.1% (5–10.2, SD 1). The primary outcomes were HbA1c level and post prandial glucose level.

Results: HbA1c level did not significantly differ between the groups after the 3 months of observation: group A vs B (median 7.05 vs 7.2%; P = 0.247), group B vs C (median 7.2 vs 6.9%; P = 0.066). There were no significant differences between the groups in regard to post prandial blood glucose levels: group A vs B (151.7 vs 153.8 mg/dl; P = 0.333), group B vs C (153.8 vs 145.2 mg/dl; P = 0.185). Patients in group A use bolus Wizard more frequently compared to group B: group A vs B (4.5 vs 2.3/day; P = 0.002). Group A patients were more satisfied in the diabetes management (P = 0.005). Incidence of self blood glucose monitoring per day was similar in all groups: group A vs B (P = 0.622), group B vs C (P = 0.279). There were no differences in the number of correctional boluses per day: group A vs B (P = 0.683).

Conclusions: The use of bolus calculator did not significantly reduce HbA1c level and post prandial glycaemia but gave patients more satisfaction from the treatment. Wireless communication between devices results in more frequent bolus calculator usage.

Poster Tour 1- Monogenic Diabetes Forms and their Treatment

P-102-219

Genetic defects in hepatocyte nuclear factor-1β, patient presentation and phenotype

M.E. van Albada[1], J. Mulder[2], M. Komhoff[2] & W.M. Bakker - van Waarde[1]

[1]*University Medical Center Groningen Beatrix Children's Hospital, Pediatric Endocrinology, Groningen, Netherlands;* [2]*University Medical Center Groningen Beatrix Children's Hospital, Pediatric Nephrology, Groningen, Netherlands*

Objectives: Maturity-onset diabetes of the young (MODY) 5 is a clinically heterogenous, autosomally dominant inherited disease encompassing early onset diabetes, renal and urogenital abnormalities and hepatic dysfunction. MODY 5 is caused by genetic defects in the gene encoding hepatocyte nuclear factor-1β (HNF-1β). It is a rare disease that is estimated to account for 3% of all MODY cases. We evaluated the presentation and phenotype of four patients with HNF-1β genetic defects from our center.
Results: In three of the four patients the discovered mutation has not yet been described. Three of them presented with renal impairment and one with decreased consciousness and severely raised glucose levels in the absence of ketone bodies. Renal function was profoundly impaired in this patient. Additional symptoms are described in table 1.
Conclusions: Genetic defects in the HNF-1β gene affect multiple organs. In patients presenting with severe non-ketotic hyperglycemia and renal dysfunction HNF-1β mutations should first be investigated. Presentation can be with impaired glucose tolerance, although presentation with kidney disease is more common in our hospital, as is in literature. Screening for related features is mandatory. Given that de novo mutations are common and given the reduced penetrance of HNF-1β genetic defects, a family history of diabetes or renal disease is frequently absent.

Table: Patient characteristics

Patient: age (y)/sex	14/F	15/F	12/F	6/M
Mutation	De novo UV exon 2 mc412G>A pGlu138Lys	UV c344G>A pSer115Asn	De novo 1.97 Mb del 17q12	Familial UV intron 4 c1045 + 12T>C
Presentation: Age Symptoms	13 years glucose >100 mmol/l, no ketones, chronic renal failure	9 months chronic renal failure, polyuria	10 years dysmorphias, umbilical hernia, left renal vein entrapment syndrome	2 months failure to thrive, chronic renal failure
Diabetes	Y	N	N	N
Exocrine pancreas insufficiency	Y	Y	N	ni
Kidney	dysplasia	dysplasia	dysplasia	dysplasia
Urogenital abnormalities	N	ni	N	ni
Abnormal liver function	N	N	N	Y
Hyperuricemia	N	Y	N	N
Hypomagnesemia	N	Y	N	N

P-370-220

The spectrum of HNF1A gene mutations in Greek patients with MODY3 diabetes: identification of seven novel mutations

C. Tatsi[1], A. Sertedaki[1], A. Vazeou-Gerassimidi[2], D. Chrysis[3], D. Delis[2], N. Tentolouris[4], C. Dacou-Voutetakis[1], G.P. Chrousos[1] & C. Kanaka-Gantenbein[1]

[1]*University of Athens, Medical School, First Department of Pediatrics, Division of Endocrinology, Diabetes and Metabolism, Athens, Greece;* [2]*P. & A. Kyriakou Children's Hospital, Diabetes Center, Athens, Greece;* [3]*University of Patras, Medical School, Department of Pediatrics, Division of Endocrinology, Rio, Greece;* [4]*University of Athens, Medical School, First Department of Internal Medicine, Diabetes Center, Athens, Greece*

Objective: Maturity-Onset Diabetes of the Young (MODY) is the most common type of monogenic diabetes accounting for 1-2% of the diabetic population. The relative incidence of HNF1A-MODY (MODY3) subtype is high in European countries; data are not available for the Greek population. The aim of this study was to determine the relative frequency of MODY3 in Greece, to describe the spectrum of the detected mutations and to elucidate its clinical phenotype.
Methods: Out of the 395 patients referred because of suspected MODY diabetes during a period of 15 years and after excluding patients with MODY2 (n = 72), 62 fulfilled the criteria for MODY and were enrolled in the search for HNF1A gene mutations. Extracted DNA was investigated by PCR amplification, Denaturing Gradient Gel Electrophoresis (DGGE) and direct sequencing, or by Multiplex Ligation Probe Amplification (MLPA).
Results: Fifteen different mutations in the HNF1A gene were detected in 16 unrelated patients and 13 of their relatives. Seven of these mutations have not been described as germline mutations before. Ten mutations were located in the DNA binding domain of the gene, while the remaining five in the transactivation domain. Clinical features, such as age of diabetes onset, severity of glycemic control or treatment did not differ in respect to mutation type or localization.
Conclusions: Almost 12% of the referred, clinically categorized as MODY patients, carried an HNF1A gene mutation suggesting that these mutations account for a significant percentage of hereditary diabetes in the Greek population. No clear phenotype-genotype correlation was identified in our cohort.

P-534-221

Wolfram syndrome - particular features of three cases

A.L. Fitas[1], I. Simão[1], D. Amaral[1] & L. Lopes[1]

[1]*Unidade de Endocrinologia, Hospital de Dona Estefânia, Centro Hospitalar de Lisboa Central, EPE, Lisbon, Portugal*

Background: Wolfram syndrome (WS) is the association of juvenile onset nonautoimmune diabetes mellitus (DM) and optic atrophy in the first decade, possibly followed by diabetes insipidus (DI) and sensorineural hearing loss, dilated renal outflow tracts and neurological abnormalities, with premature death.
Objective: To communicate three clinical cases of sporadic WS, contributing to its clinical and molecular characterization.
Methods: Case study of three patients from paediatric endocrinology clinic.

Results: The three female patients were first referred to paediatric endocrinology consultation due to new onset DM. Patient 1 had an unusually early onset of both DM and visual acuity deficit, at the ages of 29 months and 5 years, respectively. The other main features presented at close-to-average ages. She had concomitant nonclassic CYP21A2 deficiency. Patient 2 was diagnosed with DM at 9 years old, but both visual impairment and DI began later than usual, at the ages of 16 and 18 years, respectively. Patient 3 had a late onset of DM, at the age of 14 years, but all other findings began on the usual age range. All patients had DI requiring demopressin treatment. Only patient 3 did not have hearing impairment. Brain MRI examination revealed findings of variable severity, with some degree of atrophy of the optic nerves and chiasm in the three patients. Patient 1 had normal brain MRI at the age of 11 years, and 5 years later the physiological high signal intensity of the neurohypophysis was absent. Sequencing of WFS1 on patient 1 revealed a novel mutation on exon 8 (c.1619_1642dup24; p.W540_1547dup), not previously reported to the best of our knowledge.
Conclusions: These cases illustrate the heterogeneity of WS clinical presentation. Its diagnosis requires a retrospective integrative reading of the clinical scenario, as the different clinical features present throughout the years of the child's follow-up.

P-67-222

Double mutation in the glucokinase gene as a causative factor of permanent neonatal diabetes mellitus

M. Wajda-Cuszlag[1], D. Witkowski[1], E. Piontek[1], M. Szalecki[1], M. Borowiec[2] & W. Mlynarski[2]
[1]*The Children's Memorial Health Institute, Department of Endocrinology and Diabetology, Warsaw, Poland;* [2]*Medical University of Lodz, Department of Pediatrics, Oncology, Hematology and Diabetology, Lodz, Poland*

Objectives: The most frequent type of diabetes in childhood is type 1 diabetes (DMT1). Rare monogenic forms of diabetes are identified more often nowadays. The neonatal diabetes mellitus is diagnosed during the first six months of life and can be transient (TNDM) or permanent (PNDM). The most common cause of PNDM is mutation in *KCNJ11*, *ABCC8* or insulin gene. The inactivating glucokinase gene mutation can be rarely a causative factor of PNDM.
Methods: A 33-day-old boy with hyperglycemia from the first day of life was treated with intravenous infusion of insulin since 5th day of life. The child was born of the first pregnancy in the 37th week of gestation, with birth weight 2030 g and hypotrophy symptoms. The pregnancy was complicated by gestational diabetes. The insulin (0.3 mU/l) and c-peptide (0.04 ng/ml) levels were significantly below normal ranges. The immunological markers of DMT1 were negative. The continuous subcutaneous insulin infusion (CSII) using a personal insulin pump with CGM system was begun in the 60th day of life. Some abnormalities in carbohydrates metabolism were also found in the parents: mother's HbA1c was 6.8%, father's HbA1c was 6.4%. PCR method of DNA sequencing was used in genetic testing.
Results: The genetic testing detected that our patient had inherited from his parents two different mutations in glucokinase gene: *S384L* from mother and *T207M* from father. PNDM of the child is caused by the double mutation in the glucokinase gene. He is a complex heterozygote. The mutation also occurs in liver cells. Good metabolic control is difficult to be achieved. The patient has required insulin (CSII) and probably Sylfonylurea should be considered for further treatment.
Conclusions: (i) Genetic diagnosis helped to determine the cause of PNDM in the child.
(ii) MODY 2 diabetes was confirmed in the parents and established diagnosis would be useful during treatment.
(iii) CSII is effective, safe and comfortable way of treatment in children during infancy.

P-54-223

The treatment experience of adult patient suffering from pndm due to KCNJ11 mutation

Y. Tihonovich[1], E.E. Petryaikina[2], I.G. Ribkina[2], I.V. Garyeva[2], N.A. Zubkova[1] & A.N. Tulpakov[1]
[1]*National Endocrinology Research Centre, Moscow, Russian Federation;* [2]*Morozovskaya Children City Clinical Hospital of the Moscow Healthcare Department, Moscow, Russian Federation*

Introduction: Heterozygous activating mutations of KCNJ11 are the most common cause of permanent neonatal diabetes mellitus (PNDM). The majority of children could be successfully treated with oral sulfonylureas. However there are only few reports about adults transferred from insulin therapy. In the present report, we describe a female patient who was found to carry a heterozygous mutation in KCNJ11 (R201H) at the age of 17. The patient was successfully transferred from insulin to combined glibenclamide and sitagliptin treatment with significant improvement in metabolic control.
Materials and methods: KCNJ11 gene was sequenced in our patient and the heterozygous mutation R201H was identified.
Results: The female patient was diagnosed with diabetes mellitus at 3 week of age with severe diabetic ketoacidosis. From that time she was treated continuously with insulin with poor metabolic control. Her average HbA1c was 12% and she had an undetectable C-peptide. At the age of 17 the heterozygous mutation R201H in KCNJ11 gene was identified. After genetic test the patient was successfully transferred to glibenclamide at a daily dose of 1.8 mg/kg. We confirmed the effectiveness of her sulfonylurea therapy by using a continuous glucose monitoring system. After 2 months of observation, the episodic hyperglycemia (12–15 mmol/l) was marked. After the addition of Sitagliptin (100 mg/day) to glibenclamide therapy good glycemic control was achieved. After 6 months of combined treatment her HbA1c was 6.7% and her C-peptide increased to 1.3 ng/ml. After 8 months of good metabolic control, this patient, however, became noncompliant and insulin therapy was restored.
Conclusion: We recommend sequencing of KCNJ11 gene in all children and adult patients with DM diagnosed before the age of 6 months.

P-225-224

Wolfram syndrome, different phenotype in siblings with W648X/P885L genotype

M. Kocova[1], V. Dimovska Jordanova[2] & D. Kuzmanovska[1]
[1]*University Pediatric Clinic, Skopje, Macedonia, the Former Yugoslav Republic of;* [2]*University Clinic for Eye Diseases, Skopje, Macedonia, the Former Yugoslav Republic of*

Wolfram syndrome is a rare autosomal recessive neurodegenerative disorder clinically presented with a specific combination of diseases: diabetes insipidus, diabetes mellitus, optic atrophy and deafness (DIDMOAD). It is caused by mutations in the WF1 gene. Genotype/phenotype associations are weak and not well elucidated.
Objectives: To present two siblings with Wolfram syndrome with the same mutations, and different phenotype.
Case 1: A 7 years old very smart boy was diagnosed with diabetes, negative for islet antibodies. His diabetes was well

controlled on insulin with average HbA1c 7.3%. His vision started fading at the age 12 years at the onset of puberty. Detected optic atrophy suggested Wolfram syndrome. By the time of graduation from university, the young man had a vision of only 20%. Diabetes insipidus was diagnosed at the age of 20, followed by incontinence. Hearing loss was detected at the age 29 years, and impotence followed. Molecular analysis confirmed compound heterozygocity for W648X (maternal) and P885L (paternal) mutations in WFS1 gene.

Case 2: The girl (sister of the case 1) was diagnosed with diabetes at the age of 5 after a varicella infection. At the diagnosis, she was a mentally challenged child, aggressive, and it was very difficult to conduct insulin therapy. The control of her diabetes was unsatisfactory. Her progressive vision problems started, at the age of 9. Besides optic atrophy, she also developed retinopathy treated with laser photocoagulation. Corpus vitreum hemorrhage followed, and she was blind at the age of 16. She started with polyuria at the age of 16 simultaneously with hearing loss. Molecular analysis confirmed the same compound heterozygocity for parental mutations.

Conclusion: Phenotype of Wolfram syndrome can vary even in the siblings who carry the same genotype. Genotype/phenotype studies are needed to elucidate differences in the cognitive and neurodegenerative symptoms of the disease.

P-303-225

Permanent neonatal diabetes caused by a novel mutation in the *INS* gene

G. Catli[1], A. Abaci[1], S.E. Flanagan[2], A. Anik[1], S. Ellard[2] & E. Bober[1]
[1]*Dokuz Eylul University Medical Faculty, Pediatric Endocrinology, Izmir, Turkey;* [2]*Peninsula Medical School, University of Exeter, Institute of Biomedical and Clinical Science, Exeter, UK*

Background: Mutations in the preproinsulin (*INS*) gene are the second most common cause of permanent neonatal diabetes (PND).

Objective: To present a case of PND caused by a novel heterozygous missense mutation p.L30Q in the *INS* gene.

Methods: A 4-month-old female was referred because of polyphagia, polyuria and irritability. On physical examination, she had moderate dehydration with no other pathological signs. The mother was healthy with no history of gestational diabetes and the father was not known to have diabetes. Laboratory tests revealed venous glucose level of 657 mg/dl with glucosuria and ketonuria without acidosis. Serum C-peptid level was 0.41 ng/ml (normal range, 0.9–7) and HbA1c was 12.8% (normal range, 4.8–5.9%) with negative diabetes autoantibodies. The patient was diagnosed with neonatal diabetes and discharged with subcutaneous NPH insulin four times a day (0.3 U/kg/day). Molecular genetic studies, including *ABCC8, KCNJ11, INS* and *EIF2AK3* genes, were performed.

Results: Direct sequencing of the *INS* gene identified a novel heterozygous missense mutation (p.L30Q) in exon 2 of the *INS* gene. The proband has inherited the mutation from her mother who was not known to have diabetes. Interestingly, the mutation was at approximately 20% of the mothers' leukocyte DNA, raising the possibility of somatic mosaicism. The proband's maternal grandmother and grandfather were both found negative for the *INS* missense mutation. The proband's mother had a normal HbA1c level (5.6%), however, an OGTT (oral glucose tolerance test) revealed impaired fasting glucose (fasting and 2-hour post- glucose load serum glucose of 106 and 95 mg/dl, respectively).

Conclusions: We report a novel heterozygous missense mutation p.L30Q in the *INS* gene leading to PND and emphasize that the somatic mosaicism of the *INS* gene mutation, especially when present in low ratios, does not always cause insulin requiring diabetes mellitus in the parent.

Keywords: Neonatal diabetes mellitus, *INS* gene.

P-313-226

A girl with DEND syndrome caused by a novel C166G mutation in *KCNJ11* gene: evaluation of glibenclamide therapy

B. Obermannova[1], P. Dusatkova[1], S. Pruhova[1], Z. Sumnik[1], O. Cinek[1] & J. Lebl[1]
[1]*2nd Faculty od Medicine, Department of Paediatrics, Prague, Czech Republic*

Objectives: We present a child with developmental delay, epilepsy and neonatal diabetes (DEND syndrome) due to a novel mutation in the Kir6.2 subunit of the ATP-sensitive potassium channel. We aimed to evaluate the effect of glibenclamide therapy.

Case report and methods: The girl was born from uneventful pregnancy to nonconsanguineous healthy parents. Delivery was at term, birth weight 2980 g (-0.1 SDS), length 51 cm (0.5 SDS), Apgar score 7/9/10. At the age of four months she presented with failure to thrive, hyperosmotic dehydration, hyperglycaemia 37 mmol/l, but neither ketosis, nor acidosis. Insulin treatment was initiated upon diagnosis of neonatal diabetes mellitus. The HbA1c at diagnosis was 95 mmol/mol. Mixed-Meal Tolerance Test showed severely reduced beta-cell function. T1D-related autoantibodies (a-GAD, a-IA2, a-IAA) were negative. The neurologic examination showed severe psychomotor delay, with continuous hypsarrhytmia on the EEG, and hyporeflexia in the EMG. The molecular genetic testing using Sanger sequencing revealed a novel heterozygous missense mutation in the *KCNJ11* gene, C166G (c.496T >G), arising *de novo*.

Results: Only poor effects were attained with epilepsy treatment by valproic acid and vigabatrin. At the age of 10 months we attempted a switch from insulin to glibenclamide, by increasing up to 2.25 mg/kg/day in two daily doses. Although insulin could not be discontinued, EEG findings and psychomotor development improved. Diabetes is well controlled with IIT 0.6 IU/kg/day and glibenclamide, she thrives well.

Conclusion: We present a child with fully developed DEND syndrome due to a novel mutation in the *KCNJ11* gene. Her treatment with glibenclamide, although having little or no effect on diabetes, may be beneficial for her neurologic status.

Supported by institutional grant NT11402.

P-215-227

Characteristics in etiology, treatment and course of diabetes diagnosed before the age of 2 years old

I. Techmanska[1], A. Brandt[1], M. Kawko[1], K. Kopacz[2], W. Fendler[3], M. Borowiec[3], A. Szadkowska[3], A. Szypowska[4], A. Ramotowska[4], G. Deja[5], A. Noczynska[6], P. Jarosz-Chobot[5], W. Mlynarski[3] & M. Mysliwiec[1]
[1]*Medical University of Gdansk, Department of Pediatrics, Hematology, Oncology and Endocrinology, Gdansk, Poland;* [2]*Medical University of Gdansk, Department of Obstetrics, Gdansk, Poland;* [3]*Medical University of Lodz, Department of Pediatrics, Oncology, Hematology and Diabetology, Lodz, Poland;* [4]*Medical University of Warsaw, Department of Paediatric Diabetology, Warsaw, Poland;* [5]*Medical University of Silesia, Department of Pediatrics, Endocrinology and Diabetes, Katowice, Poland;* [6]*Wroclaw Medical University, Department of Endocrinology and Diabetology for Children and Adolescents, Wroclaw, Poland*

Objectives: Characterising clinical and biochemical features of children diagnosed with diabetes before the age of 2 years old.

Methods: Medical records of 131 patients from diabetic wards and outpatient clinics in Gdansk, Lodz, Warsaw, Katowice and Wroclaw were reviewed. Clinical and biochemical features at onset and in later course of diabetes were obtained.
Results: The average age at diagnosis was 16.5 months, median observation time was 6.8 years. 57% presented with DKA on admission, in 15% pH was <7.1. Partial remission occured in 15%–6 months and in 8%–12 months after diagnosis. It was longer in those without typical diabetes sympthoms and with negative GAD antibodies. Higher C-peptide levels correlated with better, but higher creatinine or lower pH at onset with worse metabolic control in the course of diabetes. Most patients (84%) used CSII. TDI and HbA1c were lower in those using CSII. During observation period 18% were diagnosed with coeliac disease and 14% with autoimmune thyroiditis. 11 patients had monogenic diabetes: in 7 KCNJ11 (R201H, V59M, G53D, H46L, Y330H), in 1 ABCC8 (V86A) and in 3 GCK (G223S) gene mutations were found. They were younger at onset and the diagnosis correlated with negative ICA. Children with K_{ATP} channel mutations had negative family history of diabetes. One child had DEND (V59M) and 3 iDEND syndrome (G53D, H46L, R201H). In all but one (Y330H) children with KCNJ11 and ABCC8 gene mutations transition to SU was possible. Most children with DEND or iDEND demonstrated improved psychomotor development and none experienced side effects of sulfonylureas. Patients with GCK mutations were heterozygotes, two of them currently receives insulin and one not.
Conclusions: Children under 2 years old are a unique group of patients: they are mostly in a serious condition at onset, rarely present remission and often develop other immune disease. Genetic testing should be done in those with negative immunological diabetes markers.

P-229-228

Delayed recognition of Wolfram syndrome misdiagnosed as type 1 diabetes with early chronic complications

A. Zmyslowska[1], M. Borowiec[1], K. Wyka[1], P. Fichna[2], B. Iwaniszewska[3], L. Majkowska[4], I. Pietrzak[1], M. Szalecki[5], A. Szypowska[6] & W. Mlynarski[1]
[1]*Medical University of Lodz, Department of Pediatrics, Oncology, Hematology and Diabetology, Lodz, Poland;* [2]*Department of Diabetes and Obesity for Children and Adolescents, Poznan, Poland;* [3]*Children's Hospital, Department of Pediatrics, Endocrinology and Neurology, Torun, Poland;* [4]*Pomeranian Medical University, Department of Diabetology and Internal Diseases, Szczecin, Poland;* [5]*Department of Metabolic Diseases, Endocrinology and Diabetology, Warsaw, Poland;* [6]*Medical University, Department of Pediatrics, Warsaw, Poland*

Objectives: Recent years due to constant improvement of research diagnostic methods and increasing knowledge have brought about remarkable progress in recognition of monogenic forms of diabetes. Wolfram syndrome (WFS) is diagnosed based on clinical criteria of coexistence of diabetes mellitus and optic atrophy.
Methods: The aim of the study was a retrospective analysis of 13 patients with clinical misdiagnosis of type 1 diabetes and early chronic complications performed in the years 1985–2010 followed by correct recognition of WFS based on genetic testing. These patients were referred to molecular analysis between 2008–2011 and diagnosis of WFS was confirmed by direct sequencing of *WFS1* gene and/or MLPA.
Results: The average age of patients at diabetes onset was 5 (4.4–6.2) years and mean value of HbA1c was 8.9 ± 2.4%. At the time of genetic analysis an average age of patients was 16 (12.3–18.5) years and mean value of HbA1c decreased to 7.4 ± 1.3%. In the study group no autoantibodies (ICA, GADA, IA2 and IAA) were found. Diagnosis of optic atrophy was performed at the average age of 9 (5.9–11.5) years, which corresponds to 4 years after diabetes recognition (P = 0.002). In most patients (9/13) optic atrophy based on electrophysiological tests and in 3/13 of patients following brain MRI was confirmed. Among these in two cases early visual impairment was treated as rapid progression of retinopathy and exact diagnosis was delayed for at least 3 years.
Conclusions: Comparing the epidemiological data from PolPeDiab project we found that the prevalence of WFS among pediatric patients with diabetes in Poland is 0.12%, and patients with WFS are primarily misdiagnosed as type 1 diabetes. Study is supported by the EURO-WABB Project and the Polish Ministry of Science and Higher Education grant No N 407 100040.

Poster Tour 2 - Monogenic Diabetes Forms and their Treatment

P-94-209

Wolfram syndrome in an Algerian family

G. Boudraa[1], M. Bessahraoui[1], V. Paquis[2], C. Rouzier[1], K. Bouziane-Nedjadi[1], M. Naceur[1], S. Niar[1], M. Gharnouti[1] & M. Touhami[1]
[1]*Clinique Amilcar Cabral, Oran, Algeria;* [2]*Service de Génétique Médicale, Nice, France*

Wolfram Syndrome (WS) is a rare progressive neurodegenerative disorder, autosomal recessive. It is characterized by insulin dependent diabetes mellitus, optic atrophy and loss of sensorinal hearing. The diabetes insipidus, deafness, the psychiatric disorders are less frequent. The WS gene, WFS1 encodes a transmembrane protein called wolframin. WFS1 was localized in 1998 on the chromosome 4p16. The aim of this study was to report the clinical and genetic profile of 3 cases with WS in an Algerian family.

Materials and methods: We present three children (1 brother and 2 sisters) diagnosed with Wolfram Syndrome. Genetic study was made by the Service de Génétique Médicale, Nice, France.

Results: The parents were consanguineous. The diagnosis of diabetes mellitus were made at the age of 10 years for the brother and 8 years for the two sisters. The brother developed bilateral optic atrophy having evolved to blindness at the age of 18 years and deafness of bilateral perception at 20 years. In the first sister, a blindness occured at the age of 13 years and a bilateral hydronephrose at 19 years. The second sister had bilateral optical atrophy at diabetes diagnosis. Genetic analysis for WFS revealed that the children were homozygous and their parents hétérozygous.

Conclusion: The WFS is a devastative disease for the patients and their familis. More studies about the WFS will lead to a better comprehension of this disease and to improvement in terms of its prevention and treatment.

P-533-210

KCNJ11 gene mutation in a Bosnian boy with relapsed transient neonatal diabetes mellitus

A. Toromanovic[1], H. Tahirovic[2], S.E. Flanagan[3], S. Ellard[3] & A.T. Hattersley[3]
[1]*University Clinical Center, Department of Pediatrics, Tuzla, Bosnia and Herzegovina;* [2]*Academy of Sciences and Arts of Bosnia and Herzegovina, Department of Medical Sciences, Sarajevo, Bosnia and Herzegovina;* [3]*Institute of Biomedical and Clinical Science, Peninsula Medical School, University of Exeter, Exeter, UK*

Background: Heterozygous mutations in the *KCNJ11* gene encoding the Kir6.2 subunit of the pancreatic ATP-sensitive potassium channel have been associated with permanent and transient neonatal diabetes mellitus (NDM). In most cases transient NDM is characterized by a relapse of diabetes later in life suggesting the disease is probably a permanent β-cell defect with variable expression during growth.

Objective: To identify the genetic cause of diabetes in a patient with relapsing diabetes who had been clinically defined as having transient NDM.

Methods: We sequenced the *ABCC8*, *KCNJ11*, and *INS* genes in a boy who presented with severe hyperglycaemia and ketoacidosis at the age of 68 days. He was treated with insulin, initially with a dose of 1.2 U insulin/kg/day, and required continous insulin treatment until the age of 11 months. Diabetes relapsed at 14 years of age. The boy has no dysmorphism or neurological abnormalities. There was no family history of diabetes.

Results: A heterozygous missense mutation p.E227K (c.679G >A) in the *KCNJ11* gene was identified in the patient. Analysis of DNA from the unaffected parents showed the mutation in the affected child had arisen de novo.

Conclusions: Our report suggests that screening for *KCNJ11* mutations is appropriate in patients diagnosed with transient neonatal diabetes mellitus as it provides valuable information concerning possible course of the disease and choice of treatment.

P-308-211

Management of neonatal diabetes due to a 6q24 mutation

J. Cropper[1]
[1]*Leeds Teaching Hospitals NHS Trust, Children's Diabetes Team, Leeds, UK*

Objectives: Babies and young children with diabetes usually achieve optimal glycaemic control by using Continuous Subcutaneous Insulin Infusion (CSII), often assisted by Continuous Glucose Monitoring (CGM). We report a case of Neonatal Diabetes due to a 6q24 mutation that did not respond well to this form of management.

Methods: A baby who was delivered at 35 weeks gestation because of Intrauterine Growth Retardation (birth weight 1.353 kg) developed diabetes at 2 days. Intravenous insulin was commenced, later changed to subcutaneous injections. Molecular genetic testing confirmed a diagnosis of Neonatal Diabetes due to a 6q24 mutation (paternal duplication). This causes Transient Neonatal Diabetes, requiring insulin treatment, and usually remits at approximately 12 weeks. Her blood glucose levels were very variable (hypo - 33 mmol/l) so she was commenced on insulin pump (CSII) therapy and CGM.

Results: This resulted in only a small improvement in glycaemic control, which is very unusual in a young child with diabetes. The blood glucose was high overnight and low after feeds, possibly due to the Incretin effect. The treatment was changed to twice daily long-acting insulin analogue, with no deterioration in control. Insulin was reduced, and then stopped altogether at 16 weeks. Hypos continued initially after treatment stopped, then occasionally overnight and in daytime during periods of illness for the first year, confirmed by CGM. Hypos during remission have also been reported in other cases.

Conclusion: This case of Neonatal Diabetes did not respond like most cases of very young onset diabetes to insulin treatment using CSII. There were also unexpected hypos during the first phase of remission. As this is a rare condition, other cases should be reviewed to see if a protocol for management of Neonatal Diabetes due to a 6q24 mutation can be developed.

P-175-212

Congenital hyperinsulinemic hypoglycemia (HH) as a result of glucokinase mutation - case report

M. Szałapska[1], A. Lange[1], E. Starostecka[1], A. Grodzicka[2], E. Gulczyńska[2] & A. Lewiński[1]

[1]*Polish Mother's Memorial Hospital, Research Institute, Department of Endocrinology and Metabolic Diseases, Lodz, Poland;* [2]*Polish Mother's Memorial Hospital, Research Institute, Department of Neonatology, Lodz, Poland*

Glucokinase (GCK) is the enzyme controlling insulin release. Mutations in GCK gene can result in various phenotypes with autosomal dominant inheritance. Both persistent hyperinsulinemic hypoglycemia of infancy and hyperglycemia (MODY-2, PNDM) are observed, depending on the type of DNA changes. Activating mutations cause oversecretion of insulin despite hypoglycemia, with good response to pharmacological treatment. The prevalence of GCK-HH is 1.2% out of all HH cases. We present a girl, born at time to unrelated young parents. Father's history revealed serious HH in childhood, treated initially with diazoxide but finally pancreatectomy had to be performed. He developed insulin-dependent diabetes in age of 26 years. Some family members are probably also affected but not diagnosed. Hyperinsulinemic hypoglycemia was diagnosed in our patient from first days of her life but was milder that in her father. DNA analysis revealed activating mutation in GCK gene, with protein effect: Val455Leu in both patients. Diazoxide therapy was introduced with good clinical response.

Conclusions: (i) The identification of a GCK mutation provides information on the prognosis of the disease and helps therapeutic decision.

(ii) It implies also the diagnostic procedures for hypoglycemia directed to other family members.

(iii) In each case of neonatal hyperinsulinism, genetic counseling should be recommended.

P-453-213

Transient neonatal diabetes: a report of two cases

C.T.B. Ngoc[1], V.C. Dung[1], B.P. Thao[1], N.N. Khanh[1], M. Craig[2], A. Hattersley[3] & N.T. Hoan[1]

[1]*National Hospital of Pediatrics, Department of Endocrinology, Metabolism & Genetics, Hanoi, Viet Nam;* [2]*George Hospital and the Children's Hospital Westmead, Westmead, Australia;* [3]*Royal Devon and Exeter Foundation Trust, Exeter, UK*

Transient neonatal diabetes mellitus type 1 (TNDM1) is a rare but remarkable form of diabetes which presents in infancy, resolves in the firstmonths of life, but then frequently recurs in later life. It is caused by overexpression of the imprinted genes PLAGL1 and HYMAI on human chromosome 6q24 and the majority of these patients have mutations in the transcription factor ZFP57.

Objective: To describle clinical features and laboratory manifestations of patient with TNDM and evaluate outcome of management.

Subject and methods: Clinical features, biochemical finding, mutation analysis and management outcome of 2 cases from 2 unrelated families were study. All exon of KCNJ11, ABCC8 and INS genes were amplified from genomic DNA and directly sequenced. If the mutation of KCNJ11, ABCC8 and INS has failed to detect, methylation - specific PCR will be done to detect the loss of methylated region on chromosome 6q24.

Results: Two cases (one girl and one boy) onset at 23 and 44 days of age with gestation age of 34 and 40 weeks and birth weight of 2000 g. Both of them admisted with the feature of polydipsia, polyuria, macroglossia and diabetes keton acidosis, blood glucose of 30 mmol/l and 31.1 mmol/l, HbA1C of 6.8% and 8.3%, respectively. Methylation - specific PCR of both patients showed maternal hypomethylation at the TND differentially methylated region on chromosom 6q24, however one patient has heterogygous mutation in ZFP57, one patient has no ZFP57 mutation who has yet unidentified cause. After 18 months and 4.5 months of diagnosis (at 19 months and 5.5 months of age) they stop insulin. Now both cases have normoglycemic (blood glucose: 5.0 and 5.9 mmol/l) at 3 years and 21 months of age, one patient has mild development delay and one patient has normal development.

Conclusion: It is important to perform screening gene mutation for patients with diabetes before 6 months of age to control blood glucose and follow up the patients.

P-278-214

Successful treatment with oral glibenclamide in neonatal diabetes mellitus caused by *KCNJ11* gene mutation

M. Okuno[1,2], R. Kuwabara[1], M. Habu[1], A. Yoshida[1], J. Suzuki[1], T. Yorifuji[2], T. Urakami[1], S. Takahashi[1] & H. Mugishima[1]

[1]*Nihon University School of Medicine, Pediatrics, Tokyo, Japan;* [2]*Children's Medical Center, Osaka City General Hospital, Pediatric Endocrinology and Metabolism, Osaka, Japan*

Background: Neonatal diabetes mellitus (NDM) is known to be frequently associated with a mutation of *KCNJ11* gene encoding the Kir6.2 subunit of the K_{ATP} channel on pancreatic beta-cells. Identification of the mutations is clinically important, because patients with such a mutation can respond to oral sulfonylureas (SUs). We present a boy with a mutation in the *KCNJ11* gene, who could switch from insulin treatment to oral glibenclamide and have sustained optimal glycemic control.

Patient and methods: The boy was born at 39 weeks of gestation with a birth weight of 2308 g (SGA). At 44 days of his life, he was found to have morbid hyperglycemia (703 mg/dl) with ketoacidosis, leading to diagnosis of NDM. Baseline C-peptide was unmeasurable and beta-cell autoantibodies were negative. Intravenous insulin was immediately started, and he was referred to our hospital. We continued insulin treatment with CSII and achieved optimal blood glucose levels. We conducted genetic analysis and found heterozygous mutation in *KCNJ11* (c.601C>T) in the boy, not in his parents. Based on the result, we decided to tailor treatment using glibenclamide in place of insulin. Glibenclamide was started at the dose of 0.2 mg/kg/day and gradually increased by 0.8 mg/kg/day and obtained optimal blood glucose levels. We concurrently decreased insulin and successfully stopped it. We later tried to change glibenclamide to glimepiride, which is known to have weaker coupling of K_{ATP} channel, but have extrapancreatic effects, however glimepiride revealed to be ineffective to achieve optimal blood glucose levels even at the high doses. The patient continued good glycemic control under oral glibenclamide as SUs without any significant adverse effects.

Discussion: We report a case with NDM who continued satisfactory response to oral glibenclamide as SUs. Further studies are needed to evaluate long-term outcome using glibenclamide.

P-480-215

Transmission of a de novo *INS* gene mutation in a family with multiple persons with insulin-dependent diabetes mellitus

K. Schnell[1], T. Biester[1], C. Tsioli[1], N. Datz[1], A. Hattersley[2], S. Ellard[2], O. Kordonouri[1] & T. Danne[1]

[1]*Auf der Bult - Diabetes-Zentrum für Kinder und Jugendliche, Hannover, Germany;* [2]*Peninsula Medical School, Diabetes Research, Exeter, UK*

Three members of an extended family developed insulin-dependent diabetes during the first year of life. This prompted a systematic genetic analysis leading to the identification of a monogenic form of diabetes in this family. The molecular diagnosis may offer a pathophysiological explanation for the cause of this rare form of diabetes. A 2 years old boy with age-appropriate development was referred to our centre. Since his 12th month of age he was treated with insulin. His HbA1c was 6.5%, with a insulin dose of 0.4 IU/kgBw/d. The mother had developed insulin-dependent diabetes at age of 3 months. Currently she was treated with a pump, her daily insulin dose was 0.48 IU/kg/Bw/d with HbA1c 8.9%. She was obese and had hypercholesterinemia. Measurements of C-Peptide, IA2- and GAD-antibodies from mother and son revealed negative results. In addition, the maternal grandmother had an abnormal oral glucose tolerance test. No other diabetes cases were known in the family, considering that presently there was no contact to the father. The mother was tested for a mutation in the ATP-sensitive K^+ Channel encoding genes but no *KCNJ11* or *ABCC8* mutation was detected. Sequencing of the *INS* gene showed a heterozygous missense mutation, R89C (c.265C >T), that was described previously in 5 families as a diabetes causing genetic mutation. The patient's affected son was also heterozygous for the mutation, but it was not present in either maternal grandparent. The reason for the early onset diabetes was a de novo-mutation in the mother's *INS* gene. This mutation is predicted to cause disruption in the folding of the proinsulin molecule. An accumulation of mutant proinsulin proteins in the endoplasmic reticulum may lead to ß-cell apoptosis. This will cause an irreversible insulin deficiency. In the meantime the mother had a child from another partner. This boy developed diabetes at age of 4 months. Genetic analysis confirmed the same mutation as in the mother and half-brother.

P-427-216

Should the diagnosis of rare types of monogenic diabetes be actively persued?

V. Boyadzhiev[1], S. Flanagan[2], V. Mladenov[1], G. Semova[1], V. Kaleva[1], S. Ellard[2], A. Hattersley[2] & V. Iotova[1]

[1]*Medical University, Varna, Bulgaria;* [2]*University of Exeter, Exeter, UK*

Objectives: We present a 3 year old girl with a rare monogenic type of diabetes.

Methods: The child was born after an uneventful pregnancy and normal delivery to young parents without consanguinity. At the age of 3.5 years she was diagnosed with insulin-dependent diabetes mellitus (IDDM) after a severe ketoacidosis and BGL of 32 mmol/l. Two weeks later the child developed pancytopenia (Hb 74 g/l, Leu 1.1×10^9/l, Thr 6×10^9/l) and several blood transfusions were done. The biochemistry, autoantibody screening tests and a flow cytometry didn't detect any abnormalities. Cytogenetic studies were normal, too. Bone marrow histology found all three cell lines well preserved but a solid part of the red blood cells showed megaloblastic changes and almost 50% of the erythroblasts were ring-sideroblasts. Meanwhile brain stem auditory evoked potentials revealed a severe sensory-neural hearing loss.

Results: Genetic analysis found a homozygous SLC19A2 frameshift mutation, c.993_996dup, which confirmed the diagnosis of Roger's syndrome or Thiamine-responsive megaloblastic anaemia- a combination of non-autoimmune IDDM, central anemia with megaloblastoidism and sensorineural deafness. Both parents are heterozygous carriers for the same mutation. Various other problems are frequently described as a part of the syndrome. In our patient we found a slight enlargement of the right-heart chambers with mild tricuspid regurgitation, as well as eye macular hyperpigmentations. After a high-dose thiamine therapy was started, the hemoglobin levels soon normalized without the need for further transfusions. Unfortunately her insulin needs didn't change significantly and although her diabetes is relatively stable, she continues on multiple-daily insulin injections.

Conclusions: Monogenic types of diabetes usually have a non-classical presentation and should be recognized duly because most of them need additional specific treatment.

P-541-217

IPEX syndrome: a Moroccan case

Z. Imane[1], A. Mdaghri Alaoui[2], F. Elmidaoui[1], N. Mekkaoui[1], S. Amhager[1], N. Benani[1], A. Touzani[1], S. Ellard[3], A. Hattersley[3] & A. Balafrej[1]

[1]*Children's Hospital of Rabat, Department of Diabetology Pediatric Endocrinology, Rabat, Morocco;* [2]*Children's Hospital of Rabat, Reference Center Neonatology, Rabat, Morocco;* [3]*Royal Devon and Exeter Hospital NHS, Department of Molecular Genetics, Exeter, UK*

Introduction: IPEX is a rare pediatric syndrome, poor prognosis, secondary to a mutation in the FOXP3 gene on chromosome X (Xp 23.11 region-q 13.3). We report the case of an infant aged 8 months suffering from IPEX syndrome confirmed by the presence of a mutation in the FOXP3 gene.

Observation: This is YD, male, from a non consanguineous marriage, who was hospitalized at the age of 5 days with acute dehydration and metabolic acidosis, and whose diagnosis of diabetes mellitus was made at day 11 to life after a misdiagnosis of neonatal infection and then congenital adrenal hyperplasia. Insulin therapy was then started. Laboratory tests found hyperglycemia, a C-peptide levels undetectable anti-GAD negative, normal liver function tests and eosinophilia. The initial genetic study has excluded common mutations responsible for neonatal diabetes (KCJN11 mutation, mutation of ABCC8). The patient subsequently developed atopic eczema at the age of 3 months, then was hospitalized twice for dehydration in acute diarrhea mucous at the age of five and seven months. The child died at the age of 8 months in an array of severe growth restriction and dehydration. The review of his case, suggested the IPEX syndrome. The search of the FOXP3 gene mutation has returned positive, and the mother is a carrier of this mutation.

Discussion: IPEX is a Deregulation immune polyendocrinopathies, autoimmune enteropathy X-linked, which often manifests itself in a boy in the early neonatal period or before the age of 4 months for insulin-dependent diabetes, a profuse secretory diarrhea responsible for a significant failure to thrive, eczema, thrombocytopenia, anemia, thyroid dysfunction and recurrent infections. The evolution is often fatal, children with rarely exceed the first year of life.

Conclusion: IPEX is rare but one should think before a boy with neonatal diabetes that develops later any autoimmune disorder.

P-71-218

Behavioral changes after glyburide treatment in a child with a KCNJ11 gene mutation diabetes

R. Roman[1,2], S. Ellard[3], S. Flanagan[3] & A. Hattersley[3]
[1]*Antofagasta Regional Hospital, Pediatric Department, Antofagasta, Chile;* [2]*University of Antofagasta, Antofagasta, Chile;* [3]*Universities of Exeter and Plymouth, Exeter, UK*

We describe a boy who presented with diabetic ketoacidosis at 7.5 months of age. As an infant he presented a mild motor development delay and later he had speech difficulties. At age 3.9 years a KCNJ11 gene mutation was confirmed and he was transferred from insulin (NPH + rapid analog 3/day, 0.7 U/k/day) to glyburide (Glyb) treatment. He presented 2 days self-limited diarrhea and transition was successfully achieved in 6 days, receiving Glyb 1.5 mg/k/day. At the moment the patient is 4.5 years old and he is on Glyb 0.5 mg/k/day divided 3 times per day. His blood glucose levels are in the normal range receiving a regular diet with sugar and his HbA1c improved from 7.8% under insulin treatment to 5.5% on Glyb. The mother has a complete medical and developmental record of his son. On Glyb treatment she observed rapid and positive behavioral changes. On Insulin his son was always hungry and never seemed to be satisfied. Since he is on Glyb he does not declare to have any abdominal discomfort but he is never hungry, he has no interest in food and his BMI has decreased. The language delay also showed a rapid improvement, on Glyb he soon started to make longer sentences and became more talkative. The patient also exhibited mood changes; on insulin she described the child as grumpy, insecure and temper, on Glyb her son became peaceful, more self confident and look happier. She also observed a rapid increase in spontaneous physical activity. Behavioral changes on Glyb vs insulin treatment in KCNJ11 gene mutation diabetes are not completely described and understood. The mood changes could be partly explained by the burden release of the multiple day injections whereas the appetite suppression might have a specific mechanism that deserves to be investigated. The developmental delay associated with this mutation is not expected to improve on Glyb whereas this clinical case suggests that some mild disabilities may improve with early treatment.

Poster Tour 1 - Diabetes Care & Education & Psychosocial Issues

P-19-297

Psychosocial and behavioural functioning among 11- to 17-year-olds with early onset type 1 diabetes

A. Stahl[1], K. Straßburger[1], K. Lange[2], K. Castillo[1], C. Bächle[1], T. Meissner[3], R.W. Holl[4], G. Giani[1], J. Rosenbauer[1] & German Pediatric Surveillance Unit

ESPED and DPV-Science Initiative, supported by Competence Network Diabetes Mellitus (Support Code 01GI0802)[1]German Diabetes Centre (DDZ), Institute for Biometry and Epidemiology, Düsseldorf, Germany; [2]Hannover Medical School, Medical Psychology Unit, Hannover, Germany; [3]University Hospital Düsseldorf, Düsseldorf, Germany; [4]University of Ulm, Institute of Epidemiology, Ulm, Germany

Objectives: To evaluate whether children and adolescents with early onset and long duration type 1 diabetes (T1DM) and the general population differ in psychosocial and behavioural functioning.

Methods: Inclusion criteria for the nationwide questionnaire survey conducted in Germany 2009–2011 were T1DM onset occurring from 0–4 years of age during the years 1993–1999. The comparison group was a representative sample from the German KiGGS study. Youths and parents answered self- and parent-report versions of the strengths and difficulties questionnaire (SDQ). Analyses were performed with logistic regression models, adjusted for age group, gender, migration background, region of residence, caregiver, proxy-informant, weight status, and prior hospitalisation. Results are reported as percentages, means and standard deviations (SD), or odds ratios (OR) and 95%-confidence intervals (CI).

Results: Survey participants were 629 11- to 17-year-olds with T1DM (54% boys, age 15.3 (1.7) years, diabetes duration 12.5 (1.6) years, HbA1c 8.3 (1.3) %). The comparison group consisted of 6813 peers (51% boys, age 14.6 (2.0) years). Based on parent-reports, the rate of 'abnormal' classified children did not differ between the two groups with respect to total difficulties score, emotional symptoms, conduct problems, peer relationship problems, or prosocial behaviour. 'Abnormal' hyperactivity was reported less often by the parents in the T1DM group (3.5% versus 6.5%, OR = 0.57 (0.35-0.92), P = 0.023). Children with T1DM did not report emotional symptoms, conduct problems, peer relationship problems, and hyperactivity different from the general population. However, they reported 'abnormal' prosocial behaviour (4.9% vs 2.9%, OR = 1.60 (1.01-2.55), P = 0.006) and 'abnormal' total difficulties (4.4% vs 2.9%, OR=1.83 (1.18-2.81), P = 0.046) more often.

Conclusions: Mental health problems have to be considered in children and adolescents with early onset and long duration T1DM.

P-210-298

Internet-based information resources for young patients and families with diabetes mellitus: a user preference survey

S.A.A. Hopkins[1], C. Pesterfield[2] & C.L. Acerini[1,2]

[1]Cambridge University, Cambridge, UK; [2]Cambridge University Hospitals NHS Foundation Trust, Western Centre, Cambridge, UK

Background: Internet-based information resources for young people and families with DM have increased, yet extent of use and perceived value in this patient group is uncertain.

Objective: To assess level of internet use for information on DM, perceived quality of patient support information available, need for a local hospital DM clinic website and type of information most needed.

Method: Questionnaire survey delivered to carers of a random sample of young people with DM (age 0-18 years) attending a tertiary paediatric DM clinic (n 280). Quality and perceived value of internet-based information was rated from 1 (poor) to 5 (high).

Results: Seventy-four carers completed the questionnaire. 96% had home internet access, of whom 76% used the internet for DM information, significantly more than used other resources e.g. books or GP ($P < 0.01$). Topics most searched were: equipment (68%), 'what is diabetes' (64%), carbohydrate counting (62%) and long-term complications (62%). 35% of respondents rated information on the internet as good, whereas 75% rated information from clinic as good. Information on 'what is diabetes' was rated highest (mean (SD) = 4.5 (0.6)); information on diabetes in school (3.0 (1.3)) and support meetings & events (3.0 (1.3)) was rated lowest. Carers who rated their confidence in managing their child's DM as ≤3 would feel significantly more confident were there a clinic website ($P < 0.01$) and there was a significant correlation between current low confidence in DM management and anticipated increase in confidence with a clinic website ($r = 0.59$, $P < 0.01$). Users found information from external websites untrustworthy (25%) and inadequate (19%), with 71% preferring to receive information from a trusted local clinic website.

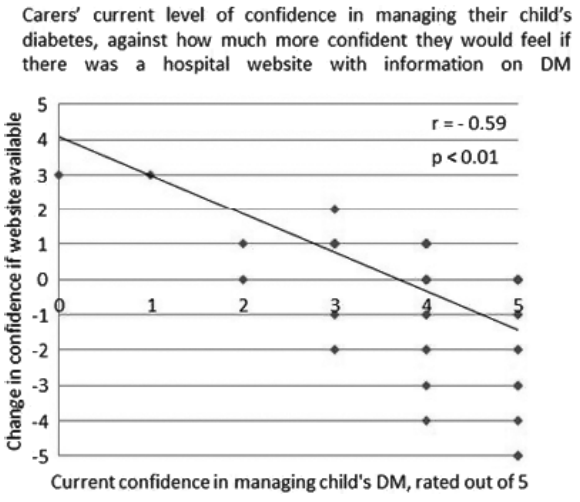


Figure 1

Conclusion: Internet use in young patients and families with DM is high but information quality is variable. Most carers would prefer a trusted local website and those with low confidence would feel more confident in managing their child's DM.

P-335-299

Deferred thyroid screening after diagnosis of diabetes - lessons from implementation of a new policy

M. Mcguigan[1], M. Yip[1], A. Ghatak[1] & P. Paul[1]
[1]*Alder Hey Children's NHS Foundation Hospital, General Paediatrics and Diabetes, Liverpool, UK*

Objectives: U.K.NICE guidelines recommend screening for thyroid dysfunction at diagnosis of type 1diabetes (T1DM) in children (www.nice.org.uk/nicemedia/pdf/CG015NICEguideline.pdf).Recent data from our centre showed that 76% of our patients with abnormal thyroid function at diagnosis had normal results on repeat testing (Joseph et al, Arch Dis Child, 2011;96:777–779). American Diabetic Association (ADA) statement 2005, suggest screening for thyroid disease several weeks after diagnosis of T1DM after metabolic stabilisation is achieved. We therefore changed our practice deferring thyroid function until 1–3 months after diagnosis. This audit assessed the implementation of this policy.
Methods: The clinical records were retrospectively reviewed of all children (<16years) with newly diagnosed T1DM over an 18 month period.
Results: Sixteen out of 56 patients (29%) had thyroid function tested at diagnosis; 8/16 patients screened at diagnosis had abnormal results but only 1 required treatment. Seventeen patients (30%) were screened between 1 and 3 months, and 16 (29%) after 3 months (range 93–325 days).All had normal thyroid function tests. Seven patients (13%) had not had thyroid function checked, including 1 patient with very poor clinic attendance, lowering overall screening rate to 87%.
Conclusions: Our data showed a significant number of false positive results when screened at diagnosis, resulting in unnecessary patient anxiety and repeat testing. This supports our deferred screening policy. It was also clear that screening could be easily missed when not built into the routine timings of diagnosis or clinic review. We have continued to perform deferred screening but modified our systems to ensure testing is performed appropriately. We believe these lessons are pertinent for those considering thyroid screening in the first few weeks after diagnosis of T1DM rather than on the day.

P-422-300

Hba1c and adherence in young type 1 diabetes patients.mThe effect of a structured transition process from paediatric department to an adolescence clinic

B.S. Olsen[1], E. Hommel[2], J. Svensson[1] & M. Wittrup[2]
[1]*Herlev University Hospital, Copenhagen, Pediatrics, Herlev, Denmark;* [2]*Steno Diabetes Center, Dpt. of Endocrinology, Gentofte, Denmark*

Objectives: As young patients with diabetes often get lost in the transition process we evaluated the effect of a structured transition process on adherence and HbA1c during the years 2006-2011.
Methods: Data was collected and a questionnaire was sent to 95 young type 1 diabetes patients regarding their experiences during transfer from the paediatric department at Herlev Hospital to the adolescence clinic at Steno Diabetes Center. The patients were informed about the transition 1 year before the transition. The paediatrician and the adult physician assessed if the patient could be transferred at 16 years of age or later. At the last visit in the paediatric clinic the patient was introduced to the future doctor from the adolescence clinic. The same doctor will follow the patient after referral to adolescence clinic. The adolescence clinic focus on the patients needs and a gradual referrel of responsibility to the patient. Parents will gradually be less present at consultations.
Results: Age at transfer was 17.7 ± 1 years and diabetes duration was 10.3 ± 4.8 years. Hba1c at transfer was 8.4 ± 1.3% HbA1c during the first year of transfer was 8.8 ± 1.5% and at follow up 8.7 ± 1.4% (mean ± SD) (ns). All the patients was screened for late complications during the first year at the adolescence clinic. No one had late complications and no patients were lost in transition or at follow up. Half of the patients returned the questionnaires being satisfied with the transfer and emphasised the importance of being informed about the transition a year in advance. Ten would have liked to be transferred earlier.
Conclusion: A tight structured process from the paediatric department clinic to the adolescence clinic is very important as the patients are not lost during the transition nor in the follow up. HbA1c is significant lover at transition but no rise in HbA1c was seen in the adolescence clinic. No patients were lost in transition, and all patients were screened for complications.

P-271-301

The transition of adolescents and young adults with type 1 diabetes: an action research for helping patients in co-constructing their health

E. Zito[1], S.M.G. Adamo[2], G. Siani[2], P. Iaccarino Idelson[1], E. Mozzillo[1], S. Galdi[1] & A. Franzese[1]
[1]*University of Naples Federico II, Pediatrics, Naples, Italy;* [2]*University of Naples Federico II, Neuroscience, Naples, Italy*

Objectives: The transition of diabetic patients from the pediatric to the adult clinic represents a challenge for medical care provision, and a potential burden for public health. In fact, young adults risk to drop out during transition and to underestimate their own illness. The aim of the study was a psychological evaluation of patients in transition, in order to create an efficacious care pathway to accompany them.
Methods: 113 subjects were divided into 2 groups:
(i) 83 adolescents; 41 M; age range:16–21 years; mean age:18.6 ± 1.6; mean HbA1c: 8% ±1.3; mean age at diabetes onset: 8.9 ± 4.6 years;
(ii) 30 young adults; 11 M; age range: 21–27 years; mean age: 23.8 ± 2.2; mean HbA1c: 7.7% ±0.6; mean age at diabetes onset: 8.9 ± 4.2.
Both groups were tested by REM-71 for evaluating defensive mechanisms, CIDS for measuring compliance, and SCL-90-R for screening psychopathology.
Results: REM-71 showed healthier and more functional psychological defense mechanisms to chronic illness in A compared with B ($P < 0.005$). CIDS showed improved compliance to diabetes care in A compared with B ($P < 0.005$). SCL-90-R did not show psychopathological profiles in both groups. Older patients presented more dysfunctional profiles than younger ones, and the majority of patients in both groups showed an intense fear of separation from the pediatricians and anxiety in meeting adult physicians.
Conclusions: Transition plays an important role in diabetic care; a structured plan is mandatory to avoid the drop out of patients and the worsening of their health. Our data suggest the need of personalized psychological supports for adolescents and young adults in order to facilitate the adaptation process and to prevent risky drop-out. Moreover, our data have suggested us to establish a joint out-patient ambulatory, in which a mixed pediatric and adult physician team meets the patient during the last visit in pediatric clinic and during the first one in adult clinic.

P-250-302

Age and gender differences with eating disorder screening tools in adolescents with type 1 diabetes

H. d'Emden[1,2], L. Holden[2], B. McDermott[3,4], M. Harris[1], K. Gibbons[5], A. Gledhill[1] & A. Cotterill[1]

[1]*Mater Health Services, Queensland Diabetes Centre, Brisbane, Australia;* [2]*Griffith University, School of Medicine, Brisbane, Australia;* [3]*Mater Health Services, Kids in Mind Research, Brisbane, Australia;* [4]*University of Queensland, School of Medicine, Brisbane, Australia;* [5]*Mater Medical Research Institute, Brisbane, Australia*

Objectives: This study compared age and gender differences for the internal consistency and concurrent validity of the Youth Eating Disorder Examination-Questionnaire (YEDE-Q) and the Eating Disorder Inventory-3 Risk Composite (EDI-3RC) against the diagnostic interview, the child Eating Disorder Examination (chEDE), in adolescents with type 1 diabetes.

Methods: Fifty-one randomly selected adolescents aged 13-18 years completed two eating disorder screening questionnaires followed by the chEDE. Cronbach's alpha was used to assess internal consistency of the tools. Intraclass correlations and Spearman's correlations were used to measure concordance of the chEDE with the YEDE-Q and EDI-3RC respectively.

Results: High internal consistencies were evident on both tools when the data was analysed separately for gender with the exceptions of the Restraint (0.60) and Eating Concern (0.65) scales of the YEDE-Q for males. High internal consistencies were seen with both tools in younger (13-15 years) and older adolescents (16-18 years).Intraclass correlations and bivariate correlations were significant for females, however, in males only the YEDE-Q Weight Concern, Shape Concern and Global scores had significant intraclass correlations, and the bivariate correlations with the EDI-3 were less consistent on all scales, with no significant correlations seen for the Bulimia Scale. Intraclass correlations and bivariate correlations were significant for younger adolescents (13-15 years) and older adolescents (16-18 years).

Conclusions: Both tools demonstrated excellent internal consistency and high levels of concurrent validity when correlated with the chEDE, when the data was stratified by female gender, younger age (13-15 years) and older aged adolescents (16-18 years). When male data was analysed separately, lower internal consistencies and concurrent validity was seen. These results support the need for male-specific eating disorder screening tools.

P-121-303

The use of a pediatric diabetes quality registry in a programme for health professionals to improved quality of care

U. Samuelsson[1], L. Hanberger[1], K. Akesson[2], A. Pettersson[3] & B. Andersson-Gäre[3]

[1]*Division of Pediatrics and Diabetes. Research Center, Linköping University Hospital, Department of Clinical and Experimental Medicine, Linköping, Sweden;* [2]*Länssjukhuset Ryhov, Department of Pedatrics, Jönköping, Sweden;* [3]*The Jönköping Academy for Improvement of Health and Welfare, Jönköping, Sweden*

Objectives: To investigate if participating in a quality improvement (QI) programme based on a collaborative learning model for health professionals could facilitate for paediatric diabetes teams to improve and equalize quality of diabetes care.

Methods: Twelve teams at paediatric diabetes centres treating 30% (2302/7660) of the patients in Sweden participated in the 18 months programme. Each team defined treatment targets and areas needing improvement, and made action plans. Main outcome was centres' mean HbA1c but other clinical variables were also studied. The six months before start (November 2010 - April 2011) were compared with the first six months of the programme (May - October 2011).

Results: All centers had reduced their mean HbA1c the second period compared to the first, range 0.1 - 6.1 mmol/mol, mean 2 mmol/mol ($P < 0.001$). One clinic, for example, decreased the proportion of children with HbA1c <70 mmol/mol from 27% to 17%. More than 50% of the centers reduced the frequency of severe hypoglycemia and/or ketoacidosis and 42% of the centers reached the goal that all their patients should have some sort of psychical activity, at least once a week. The completeness of data in the registry was improved.

Conclusions: QI methodology can help team members to improve quality of pediatric diabetes care and thereby contribute to reduce the risk of late complications for children and adolescents with diabetes. Access to a quality register is a useful tool both for follow up of results and finding areas needing improvement.

P-299-304

School nurses' experience and comfort with diabetes management: data from 5 years of diabetes education programs for school nurses

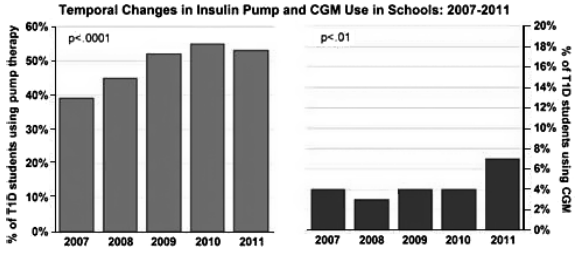
R. Joosten[1], L.K. Volkening[1] & L. Laffel[1]

[1]*Joslin Diabetes Center, Boston, USA*

Objectives: School nurses (SNs) have a major role in the care of children with diabetes. To assess SNs' experience and comfort with diabetes care, we evaluated SN education programs conducted by a single pediatric multidisciplinary diabetes team.

Methods: During 9 SN diabetes education programs conducted in 2007-2011, 1052 SNs (90% of attendees) completed surveys about diabetes management in schools.

Results: SNs cared for 2451 students with type 1 diabetes (T1D) and 279 students with T2D among ~620 000 total students. 71% of SNs had >20 years of nursing experience while 56% had ≤10 years of SN experience. 85% of SNs reported at least 1 current student with T1D/T2D. While 37% of SNs reported a recent T1D Dx in their schools, only 9% reported a recent T2D Dx ($P < 0.05$). Similarly, over the previous 5 years, 37% of SNs reported more students with T1D; 9% reported more students with T2D. 50% ($n = 1234$) of T1D students received pump therapy; 59% of SNs cared for at least 1 pump-treated student. Only 5% ($n = 112$) of T1D students used CGM. Both pump and CGM use increased over time (see Figure). Overall, 65% of SNs reported that T1D students received pre-lunch insulin. 54% of SNs reported little/no comfort troubleshooting insulin pump therapy in school. Despite this discomfort, 37% of SNs reported a desire for more pump use among T1D students.



[Figure]

Conclusions: The combination of increased childhood diabetes and advanced treatment approaches supports the need for ongoing SN education programs.

P-29-305

Treating type 1 diabetes in Nepal: experience from Patan Hospital and the International Diabetes Federation Life for a Child Program

B. Paudyal[1], G. Ogle[2], S. Shrestha[3] & H. Allen[4]
[1]*Patan Academy of Health Sciences, Patan Hospital, Internal Medicine, Lalitpur, Kathmandu, Nepal;* [2]*International Diabetes Federation Life for a Child Program and HOPE Worldwide, Sydney, Australia;* [3]*Patan Academy of Health Sciences, Patan Hospital, Paediatrics, Lalitpur, Kathmandu, Nepal;* [4]*Baystate Medical Center, Pediatrics, Springfield, MA, USA*

The exact burden of type 1 diabetes in Nepal is not known. With an annual per capita income of USD 490, the diagnosis of diabetes during childhood is likely to bring a huge financial burden to most Nepali families where the annual cost of diabetes care is roughly USD 600. Because therapy has been unaffordable, most diagnosed children did not have access to even basic diabetes care. This resulted frequently in death, or chronic complications with huge social impact: early drop out from school, unemployment, and inability to support a family later in life. Given this awful scenario for children with diabetes, the IDF's Life for a Child program (LFAC) was launched in Nepal in Patan Hospital in 2006. Over 5 years, more than 50 patients from different parts of the country have received support through this program. Patan Hospital treats nearly 100 young type 1 diabetics. Children in need are enrolled in the LFAC for support: clinical care, diabetes education, supply of insulin, syringes and SMBG devices, and HbA1c and urine microalbumin testing. They are supported up to age 25. They are followed every few months; occasional social programs are organized to enhance their confidence in managing diabetes. An initial study of 46 (24 males and 22 females) of these patients revealed the mean age of onset of diabetes was 12 years. 60% were from outside the Kathmandu valley (site of Patan Hospital). 61% were diagnosed in ketoacidosis (DKA). Mean daily insulin requirement was 0.96 U/kg/day. All are on two injections per day. 43% of patients were admitted in the last 12 months, mostly (84%) for diabetes-related incidents. The average HbA1c was 8.2%. In the last 12 months, hypoglycaemia was very common (87%), severe hypoglycaemia was rare (6%). 90% were pursuing regular education. There have been no definite deaths but 6 patients are lost to follow up. The Patan Hospital / LFAC program could be a model of care for patients with type 1 diabetes in low-income countries like Nepal.

P-49-306

Children and adolescents with type 1 diabetes in Nepal: beyond glycaemic control

S. Shrestha[1], P. Kansakar[1], B. Poudyal[2], G. Ogle[3] & A. Holley[4]
[1]*Patan Academy of Health Sciences, Paediatrics, Lalitpur, Nepal;* [2]*Patan Academy of Health Sciences, Patan Hospital, Internal Medicine, Lalitpur, Nepal;* [3]*International Diabetes Federation (IDF) Life for a Child Programme, Sydney, Australia;* [4]*Baystate Medical Center, Springfield, USA*

Nepal is a developing country in Southeast Asia which has limited heath care facilities and low literacy rates. A descriptive observational study assessing social and economic issues impacting diagnosis and subsequent care in 47 children and adolescents enrolled into the Life for a Child (LFC) program at Patan Hospital was undertaken using some questionnaires and reviewing the patient records. The mean age of our children is 15.5 years and the mean age at diagnosis was 11.8 years. The duration of symptoms before diagnosis ranged from a few days to 2 years with a mean duration of 3.3 months. Most children had several visits to the local level health facilities and private clinic visits before a diagnosis of Type I diabetes was made. More than one third of the families went to alternative medicine practices early in the disease course. Eighteen of the children enrolled are from Katmandu valley while 3 families moved to Katmandu after their child's diagnosis. For children from outside Katmandu, the distances to the nearest health facility ranged between 15 minutes to 2 hours. Few of the parents of these children had education beyond grade 10. Many were illiterate and some were literate but with no formal schooling. HbA1c values were lower in children with educated parents and so was the duration of symptoms to diagnosis. Less than a half of the children and/or parents were able to adjust the insulin dosage on their own. Among children and adolescents between 2 to 20 years 36% had a BMI of <5%ile at the time of enrollment. Most children are continuing their studies, though some were at grades not appropriate for their age and a few left schools due to financial constraints. Lack of awareness, unavailability of blood glucose testing at local level health facilities, delay in diagnosis, poor health support system and non-affordability to lifelong treatment are the main challenges. The support from LFC program has played an important role in the lives of these children.

Poster Tour 2 - Diabetes Care & Education & Psychosocial Issues

P-348-276

A service improvement project to introduce and evaluate the assessment of psychosocial issues for adolescents during routine diabetes outpatient care, using the DAWN MIND Youth Questionnaire (MY-Q)

J. Pennisi[1], H. D'Emden[1], A. Cotterill[1] & T. Sadler[2]
[1]*Mater Health Services, Queensland Diabetes Centre, South Brisbane, Australia;* [2]*Mater Health Services, Child and Youth Mental Health Services, South Brisbane, Australia*

Objectives: To evaluate the implementation of psychosocial assessment and discussion of outcomes for Adolescents aged 14-18 years, during routine Adolescent Diabetes Clinic appointments. Assessment of psychosocial issues of Adolescents living with type 1 diabetes is difficult for Diabetes Clinicians during the routine clinical encounter. Previous research by DeWit et al led to the development of the Mind Youth Questionnaire (MY-Q), to facilitate a holistic assessment of diabetes issues as well as general psychosocial problems, during routine clinical care. This project assesses the acceptability of implementing the MY-Q for young people with diabetes during routine care, and determines the sustainability of this process using available resources.
Method: Adolescents aged 14-18 years (n = 21), were invited to complete the MY-Q, at their routine three monthly diabetes clinic appointment. Outcomes of the MY-Q were discussed with the Adolescent during the consultation with the Diabetes Clinician. Evaluations were completed at the conclusion of the consultation (adolescents) and the conclusion of the clinic (clinicians).
Results: The MY-Q assessment and discussion of outcomes has been trialled in 21 adolescents, during April/May 2012. Evaluations by clinicians and adolescents have demonstrated that the process is acceptable, facilitated the clinician's understanding of how the adolescent is coping and supports the incorporation of this process biannually into routine care.
Conclusions: The MY-Q provides the Diabetes Clinician with a succinct, comprehensive assessment of how the adolescent is coping, which subsequently guides the clinical consultation and care planning to the individual needs of the adolescent. Future research will utilise the MY-Q to assess the types of psychosocial issues identified by adolescents, observe for patterns of frequency as well as correlation between psychosocial well-being and HbA1c for Australian adolescents with Type 1 diabetes.

P-383-277

Is low carbohydrate diet an alternative in poorly controlled late adolescent type 1 diabetic girls?

I. Arslanoglu[1]
[1]*Duzce University School of Medicine, Pediatric Endocrinology, Duzce, Turkey*

Objectives: The primary purpose of the study is to test the usefulness and very short term safety of low carbohydrate diet in a strictly defined subset of type 1 diabetic adolescents, secondarily to test the hypothesis whether it diminishes glycemic excursions and to emphasize its benefits if any.
Methods: In this prospective study ten type 1 diabetic late adolescent (Tanner 5) poorly controlled girls wore glucose sensors (paradigm®veo and guardian® from Medtronic) for six days each and during this period they were asked to consume standart carbohydrate diet (SC) for a three and low carbohydrate diet (LC) for the other three days in a cross-over fashion. At baseline routine clinical screening including BMI, HbA1c was performed, blood beta OH butyrate (ßOHB) was checked and repeated at the and of each three-days period when a satisfaction questionnary was filled as well. Results were analyzed by Wilcoxon test using SPSS v19.
Results: Age, diabetes duration, BMI and HbA1c were 15.2 (13-17.2) years, 5.3 (3.2-6.8) years, 25.3 (19.4-31.2) and % 9.6 (7.8-12.2) respectively. Daily carbohydrate consumption and insulin dose were 152.4 ± 51vs 46.1 ± 16.5 g and 69.7 ± 23.8 vs 60.3 ± 24.4 IU during SC and LC periods respectively. ßOHB was high ($P < 0.011$) and mean glycemia, Area Under Curve High and insulin dose were low during LC period ($P < 0.013$, 0.022 and 0.007 respectively).
Conclusions: The current dietetic advise of ''food pyramide'' for the general public and its strict use for diabetic people in some clinics so that patients are forced to consume a certain amount of carbohydrates is debatable. This study, allthough not designed to test long term outcomes shows that at least same degree of glycemic stability (if not greater) is possible with low carbohydrate diet accompanied by lower glycemic means and insulin doses. Whether or not mild ketosis is dangerous is subject to investigate.

P-389-278

Prevalence of depressive symptoms in type 1 diabetic children with excellent metabolic control

A. Szypowska[1], B. Zduńczyk[2], J. Sendela[2], H. Trippenbach-Dulska[2], M. Lipka[2], M. Procner-Czaplińska[2] & L. Groele[2]
[1]*Medical University of Warsaw, Paediatrics, Warsaw, Poland;* [2]*Medical University of Warsaw, Warsaw, Poland*

Objectives: Depressive symptoms have been commonly found in youths with type 1 diabetes. They are often associated with poor metabolic control. However, excellent control of diabetes might be also connected with emotional distress. The aim of this study was to evaluate the prevalence of depressive symptoms in type 1 diabetic children with excellent control of diabetes.
Methods: The study was performed in the Department of Paediatrics, Medical University of Warsaw. 181 children with HbA1c ≤7% and illness duration minimum 1 year took part in this study: 94 girls and 87 boys with mean age: 12.7 years <7-17, SD 3.0>. Mean diabetes duration: 3.5 SD 2.9 years, mean HbA1c 6.3 SD 0.5%, mean daily insulin dose 0.75 SD 0.25 U/kg/24 hour. Children were asked to fill in Polish version of Children's Depression Inventory (CDI). Patients ≥11 years were asked to answer questions in Quality of Life Questionnaire, based on the DCCT Diabetes Quality of Life Measure. At the same time other data was collected: sex, age, diabetes duration, HbA1c, BMI, daily insulin dose. Statistical analysis was performed using Sperman rank correlation and Mann-Whitney test.
Results: Thirteen percent (24/181) participants scored ≥13, indicating elevated depressive symptoms. There was a significant correlation between scores on the CDI and quality of life ($r = 0.53$, $P \leq 0.0001$) or age of children ($r = 0.19$, $P = 0.009$). There was no difference in BMI or daily insulin

dose in children with CDI ≥ 13 and CDI < 13. No difference was noted between girls and boys on the CDI scores.
Conclusion: Thirteen percent participants with HbA1c ≤7% showed elevated depressive symptoms. Children and adolescents with higher scores on the CDI had worse quality of life and were older. It is necessary to pay attention to emotional wellbeing of children and adolescents with diabetes type 1 regardless of HbA1c. An intervention program aimed at prevention of emotional problems in youths with diabetes should be developed.

P-460-279

Pain and blood flow with a new lancet with comfort zone technology: results of randomized double-blinded study in 134 youth with type 1 diabetes

E. Marquardt[1], O. Kordonouri[1], C. Frömke[2], S. Blaesig[1], K. Remus[1], B. Aschemeier[1], A. Koch[2] & T. Danne[1]
[1]*Kinder- und Jugendkrankenhaus 'Auf der Bult', Diabetes Centre, Hannover, Germany;* [2]*Medical School Hannover, Institute of Biometry, Hannover, Germany*

Objective: Pain associated with blood sampling may be a major obstacle to intensive insulin therapy in pediatric diabetes patients. Comfort Zone Technology (CZT) targets the sensation and perception of pain with a series of 8 raised dots on the platform stimulating the nerve endings when lancing. Potentially this device may offer less pain and improve blood volume.
Methods: The 28G UNISTIK 3 Lancet with and without Comfort Zone Technology (UkCZT and Uk; Owen Mumford Ltd) were compared. A customary Lancet (Haemolance 28G, Haem, Ypsomed) was included for reference. The single centre study used a crossover design with three treatments in three sequences and three periods. It included 134 pediatric patients 8 to 21 years (67♂; mean age ± SD 13.8 ± 2.95 years, diabetes duration 5.9 ± 3.9 years). Subjective pain perception was assessed using visual analog scale (VAS, 0-100 mm; 100 very painful) with blinded patient and investigator. Quantity of blood sampling was captured by filter paper (mean diameter in mm). Differences in pain perception and leakage were analysed with fixed effects of variances (ANOVA).
Results: The study failed to prove the primary objective of a significant reduction of VAS with the UNISTIK 3 with Comfort Zone Technology compared to the Haemolance lancet ($P = 0.3441$). The difference in means was -2.295 mm with a 95% confidence interval [-7.078; 2.487] numerically favouring the UNISTIK lancet. The key secondary aim was to evaluate the difference between the two lancets in blood flow from the blood sampling. The difference in means was 0.979 mm [0.516; 1.441] favouring the UNISTIK lancet with Comfort Zone Technology ($P < 0.001$) as well.
Conclusion: Although the study failed to prove superiority in pain reduction of the UNISTIK 3 with Comfort Zone Technology, this lancet is advantageous regarding the increased blood flow from the blood sampling under a condition where pain is not increased.
The study was supported by an unrestricted grant from Owen Mumford Ltd.

P-525-280

Conversation MAP: a new educational tool for type 1 diabetes patients and their family members

A. Salvatoni[1], R. Cardani[1], G. Bianchi[1], A. Ripepi[1] & G. Musolino[1]
[1]*Univ. of Insubria, Pediatric Endocrinology Unit, Varese, Italy*

Objectives: Conversation MAPs are educational tools developed for self-education and empowerment of patients with chronic diseases, widely successfully used in type 2 diabetes mellitus patients. A Conversation MAP (CM) broaching the impact of type 1 diabetes mellitus in the family life has been recently developed. We conducted a pilot study on educational effectiveness and attractiveness of its use in patients with type 1 diabetes and in their families.
Materials and methods: We proposed to forty families of patients with disease duration of at least six months, randomly selected among those referred to our pediatric diabetes clinic, to attend a session of CM on ''Living in a Family with Type 1 Diabetes'' Conversation Map™ (created by Healthy Interaction Inc., in collaboration with International Diabetes Federation, sponsored by Lilly). A certified facilitator (AS) coordinated the sessions. Few weeks after the CM session we mailed to all participants a ten items anonymous questionnaire designed to explore their satisfaction.
Results: 64 subjects belonging to 27 families attended eight CM sessions. 24 (37%) were type 1 diabetic patients, 33(52%) parents, 3(5%) siblings and 4(6%) other figures. At present we have received 25 filled questionnaires (40%). Based on responses to the questionnaire, more than half of the participants felt at home during the session, 73% learned new things and 30% said they had changed their attitude in the management of the disease. Most of them (92%) would suggest the participation at a CM session to one of their friends and (76%) would attend to another CM session themselves.
Conclusions: According to our preliminary results the CM ''Living in a Family with Type 1 Diabetes'' seems to represent a useful and attractive educational tool for children and adolescents with type 1 diabetes and their families. Further studies have to be conducted to establish the impact of the use of CM on metabolic control and quality of life.

P-31-281

The development and evaluation of Siriraj diabetes education tool "DM wonder trip"

U. Leelapreechalert[1], C. Hudthagosol[2], P. Jearnanrongrit[1], J. Santiprabhob[1], P. Nakavachara[1] & S. Likitmaskul[1]
[1]*Faculty of Medicine Siriraj Hospital, Division of Endocrinology and Metabolism, Department of Pediatrics, Bangkok, Thailand;* [2]*Faculty of Public Health, Mahidol University, Department of Nutrition, Bangkok, Thailand*

Introduction: Appropriate diabetes self management education, emergency management events and being proper health behaviors are the keyword of treatment for type 1 diabetes mellitus patients and family. However traditional learning technique rarely contains the elements of learning meaningful, variety and fun.
Objective: To develope, implement and evaluate an effective tool for children with type 1 diabetes mellitus in areas of health education and disease management.
Materials and methods: DM wonder trip game is developed and be able to play up to five persons at a time. It's composed of one broad game and three different types of playing cards. After playing the game, 107 participants (53 patients aged 8.2 to 25, 44 observers and 10 physicians as educator) from DM camp and DM clinic who have attended diabetes self-management

education and skills course at camp and Siriraj Hospital, fill out questionnaire which consists of degree of entertainment, usability and clinical usefulness immediately.
Results: Most participants agreed that the game was useful as a learning tool for type 1 diabetes children. (83% of patients, 93% of observers and 100% of educators). In subset analysis, patients over 15 years old reported full scored of usefulness. All group of participant s (patients, observers and educators) assessed degree of entertainment below 80% (60%, 74% and 70% respectively), and usability (84%, 91% and 60% respectively). There were no significant difference in HbA1c, aged, duration of disease and starting age of diagnosis between the groups that felt the tool useful or not.
Conclusion: The result suggests that Siriraj diabetes Education tool ''DM wonder trip'' could be an effective tool for understanding in diabetes self care. More research is needed to study the long term effect of this intervention.
This study is supported by Sirraj Grant for Research Development and Medical Education, Faculty of Medicine Siriraj Hospital, Mahidol University.

P-166-282

Does an interactive website provide additional support to young people participating in an educational intervention for type 1 diabetes?

A.C. Mcpherson[1,2], K. Price[3] & KICk-OFF Study Group
[1]*Holland Bloorview Kids Rehabilitation Hospital, Bloorview Research Institute, Toronto, Canada;* [2]*University of Toronto, Dalla Lana School of Public Health, Toronto, Canada;* [3]*Sheffield Children's Hospital, Sheffield, UK*

Objectives: To evaluate a website designed to provide information and support through interactive models, quizzes, an online forum and blog to 11-16 year olds taking part in the RCT of KICk-OFF, an intensive, educational intervention.
Methods: Evaluation included usage statistics and semi-structured phone interviews to identify facilitators/barriers to website use. From the intervention arm (n = 196), 3 user groups were identified: 5+, 1-4, and 0 logins; 10 participants were randomly selected from each of the first 2 groups and the 2 youth who had never logged were interviewed.
Results: Between 1 Oct 2009 and 1 Oct 2011, there were 2452 visitors (60.28% new, 39.72% returning), with highest visit rates for the forum, followed by carbohydrate portions, correction doses and insulin calculations. In May 2011, 22 youth (8 males) were interviewed with an average website access rate of 4.5 times (range 0-31). Few recalled the website well; of those who did (n = 10), 100% rated it easy to use, 67% felt they had learned something, 89% would recommend it to a diabetic friend, 89% felt the pictures helped them understand their diabetes, 86% felt it was fun, 75% liked the discussion forum. Only 1 person felt using it was a waste of time. Key barriers to use related to forgetting about the website (n = 2) and/or username/password (n = 4) and using other websites to maintain contact e.g. Facebook (n = 6). Few messages were left on the forum or blog and this lack of use deterred others. Those in touch with others from KICk-OFF talked about topics other than diabetes.
Conclusions: Whilst many youth felt online information and support was useful, this did not translate into them using the website as intended. Despite youth input in design, they preferred mainstream websites used in their everyday life. Youth may require regular, ongoing encouragement to access specialist websites. It may also be fruitful to incorporate education and support into young people's existing communication networks.

P-226-283

Fathers' encounter of support from pediatric diabetes teams: the tension between general recommendations and personal experiences

Å. Boman[1], L. Povlsen[2], E. Dalhborg-Lyckhage[1], R. Hanas[3] & I. Borup[2]
[1]*University West, Division of Caring Sciences, Trollhattan, Sweden;* [2]*Nordic School of Public Health NHV, Gothenburg, Sweden;* [3]*NU Hospital Group, Dept. of Pediatrics, Uddevalla Hospital, Uddevalla, Sweden*

Objectives: The purpose of this Grounded Theory study was to explore and discuss how fathers involved in caring for a child with diabetes type 1 experienced support from Swedish pediatric diabetes teams (PDTs) in everyday life with their child.
Methods: Eleven Swedish fathers of children with diabetes type 1, scoring high on involvement on the Parents Responsibilities Questionnaire (PRQ), participated. Data were collected from January 2011 to August 2011, initially by Online Focus Groups Discussions (OFGDs) in which six of 19 invited fathers participated. Due to high attrition the data collection continued by performing eight individual interviews. A semi-structured interview guide was used, and the fathers were asked to share experiences of their PDT's support in everyday life with their child.
Results: A simultaneously and constant comparison approach to data collection and analyses allowed the core category to emerge: *The tension between general recommendations and personal experiences*. The core category illuminates how the fathers experienced tension between managing their unique everyday life with their child and balancing this to meet their PDT's expectations with regards to blood glucose levels. The core category was supported by two categories: *the tension between the fathers' and their PDT's knowledge*, where fathers reported discrepancies between their PDT's medical knowledge, and their own unique knowledge of their child, and *the tension between the fathers' and their PDT's goals*, where the fathers identified differences between the family's goals and their PDT's goals. As a dimension of the core category, fathers felt trust or distrust in their PDT.
Conclusions: We conclude that to achieve high quality support of children with diabetes and to enhance their health and well-being, involved fathers' knowledge of their unique family situation needs to be integrated into the diabetes treatment.

P-53-284

There is a bright future in the management of diabetes in children in resource limited countries

E.S. Majaliwa[1], K.C. Muze[1], K. Ramaiya[2], E. Licoco[3], Z. Ngoma[4] & G. Kagaruki[5]
[1]*Muhimbili National Hospital, Paediatric and Child Health, Dar es Salaam, Tanzania, United Republic of;* [2]*Hindu Mandal Hospital, Internal Medicine, Dar es Salaam, Tanzania, United Republic of;* [3]*Muhimbili National Hospital, Internal Medicine, Dar es Salaam, Tanzania, United Republic of;* [4]*Tanzania Diabetes Association, Dar es Salaam, Tanzania, United Republic of;* [5]*National Institute for Medical Research, Dar es Salaam, Tanzania, United Republic of*

Introduction: Effective monitoring of biochemical and physical parameters of children with type 1 diabetes is of paramount importance to children's health status. Failure to do so can lead to inadequate and poor control resulting in premature complications and deaths; especially when the children are vulnerable to socio-economic and cultural problems.
Methods: This clinical audit was conducted at the Muhimbili National Hospital (MNH) to review trends in the glycemic control since the initiation of specialised clinic for children with

type 1 diabetes. Assessment included review of clinic case files, laboratory parameters and physical; measures.

Results: The MNH clinic for children with type 1 diabetes is overseen by two paediatric endocrinologists who were trained at the East African Endocrine centre in Nairobi, Kenya. The clinic also has two nurses/educators who have had specialised training in diabetes education. There are 170 children attending the clinic once or twice a month as per their blood glucose control. There has been a significant improvement in the level of glycated hemoglobin (HbA1C) from the clinic mean of >14% in 2005 when the specialised clinic was started to 9% currently. However, some of the children with type 1 diabetes are still facing the following challenges: having poor glycaemic control, poor compliance with insulin, wrong dosages and lack of parental guidance. Although children have free access to glucometer and test strips, there are many who do not do regular self-blood glucose monitoring.

Conclusion: There are several lessons to learn: persistence, education as many times as possible and making children with type 1 diabetes and their parents responsible for their blood glucose control can make a significant difference in their blood glucose control and improving quality of life.

P-57-285

How does nutrition impact on growth and development of children with diabetes

T.N. Whorms-Riley[1]

[1]*North East Regional Health Authority, St. Mary Health Department Nutrition Unit, St. Mary, Jamaica*

The new WHO growth charts assess some indicators for growth and development in children these are; Weight-For-Age, Length-For-Age and Weight-For-Length and BMI-For-Age used in children above 60 months.The charts are used in the nutrition clinics to assess growth problems such as underweight, stunting, wasting and obesity. Children on insulin that continues to have frequent fluctuations in blood sugar could be affected in their overall cognitive development. The brain depends on sugar for functioning and frequent hypoglycemia or hyperglycemia affects the day to day processing of brain activities. The aim of therapy is to achieve a near normal serum glucose concentration to avoid hypo- and hyperglycemia by providing food supplements to low income families in order to help them with the management of their child's diabetes. It is important to regulate blood sugar as best as possible by consuming regular small meals, in order to lessen the risk of diabetic complications. There are children with Weight-For-Age Z-score of above 1 to 3, which is an indication of obesity that could be related to the constant high blood sugar levels and possible lack of physical activity. There is no real need for special scientific or commercially developed diabetic foods for children battling diabetes to achieve optimal growth and development. The quality of homemade foods is equally and in many cases higher in biological value than commercially prepared supplemental therapy. Children with diabetes should be governed by a strictly regulated and highly disciplined dietary intake; this should be synchronized with physical activity and the amount of insulin given; this as proven to be effective in many nutrition clinics. Recommendations should be made to non-government organizations to offer supplemental feeding to families of lower income societies as we do in our area. This has helped our nutrition clinic patients with managing their diabetes.

Poster Tour 3 - Diabetes Care & Education & Psychosocial Issues

P-228-307

Adolescents with diabetes and high HbA1c - a neurodevelopmental perspective

C. Nylander[1,2], H. Toivonen[3], S. Nasic[4], U. Söderström[2,5], Y. Tindberg[1,2] & E. Fernell[4,6]

[1]*Uppsala University, Women's and Children's Health, Uppsala, Sweden;* [2]*Mälarsjukhuset, Pediatrics, Eskilstuna, Sweden;* [3]*Skaraborg Hospital, Pediatrics, Skövde, Sweden;* [4]*Skaraborg Hospital, Centre for Research and Development, Skövde, Sweden;* [5]*Örebro University, School of Health and Medical Sciences, Örebro, Sweden;* [6]*Sahlgrenska Academy, Gothenburg University, The Gillberg Neuropsychiatry Centre, Gothenburg, Sweden*

Type 1 diabetes is a complex disease that demands continuous compliance in insulin regimen and blood sugar measurements. Good cognitive skills, such as planning, theoretical thinking and memory are needed for independent management of the diabetes treatment. The Nordic validated Five to Fifteen (FTF) questionnaire targets neurodevelopmental qualities within eight domains (memory, learning, language, executive functions, motor skills, perception, social skills, and emotional/behavioural problems). Scores above the 90th percentile are considered as definitive problems and scores above the 75th percentile as mild.

Objectives: Our aim was to explore whether neurodevelopmental problems might be correlated to high HbA1c in adolescents with type 1 diabetes.

Methods: A population-based study was performed among patients with type 1 diabetes (5-16 years) in Skövde, Lidköping and Eskilstuna, Sweden (n = 231). Parents completed the questionnaires. 187 questionnaires were available for analysis (81%). Patients with HbA1c ≤8.0% and >8.0% (73 mmol/mol), respectively, were compared with regard to scores in the FTF questionnaire.

Results: Patients with HbA1c >8.0% had more memory and learning problems compared to the group with HbA1c ≤8.0% (P = 0.01). This correlation was seen especially in adolescents (12-16 years) with HbA1c >8.0%, where mild executive problems, adjOR 3.1 (1.1-9.1), definite memory problems, adjOR 5.0 (1.2-20.1) and definite learning problems, adjOR 5.0 (1.5-17.2) were seen after adjustment for gender, diabetes duration and age of onset.

Conclusions: Neurodevelopmental problems are common among adolescent patients with type 1 diabetes and poor metabolic control. Early screening for such problems might contribute to optimize the metabolic control in adolescent patients.

P-246-308

Aspects of family functions and mental health status of Greek adolescents with type 1 diabetes melitus (T1DM) - preliminary report

K. Karavanaki[1], B. Kandyla[1], H. Tzavara[2], C. Bacoula[3] & A. Tsitsika[2]

[1]*University of Athens, Diabetes Unit, Second Pediatric Department, 'P. & A. Kyriakou' Children's Hospital, Athens, Greece;* [2]*University of Athens, Adolescent Health Unit (A.H.U.), Second Pediatric Department, `P. & A. Kyriakou' Children's Hospital, Athens, Greece;* [3]*University of Athens, Second Pediatric Department, `P. & A. Kyriakou' Children's Hospital, Athens, Greece*

Introduction: Conflicts between adolescents with type 1 diabetes mellitus (T1DM) and their parents are quite common in previous studies, while higher prevalence of depression, stress and introvert feelings are also noted. There are no relevant data concerning adolescents in Greece.

Aim: Study of family functioning and psychosocial health status in adolescents with T1DM vs healthy subjects.

Material and method: We studied 69 adolescents aged (mean ± SD) 16.3 ± 2.0 years. Twenty three T1DM adolescents (age: 16.8 ± 2.7 years, T1DM duration: 6.68 ± 3.2 years, HbA1c:9.01 ± 1.9%) were compared to 46 healthy controls, matched for age, gender and socio-economic level. The Anonymous Youth Self Report (YSR) scale was used to estimate emotional problems and behaviour, while the Family Assessment Device (FAD) was used to assess family functioning.

Results: Concerning FAD, T1DM was associated with lower grades in «Communication» (P = 0.023) and «Emotional involvement» (P = 0.045), indicating that the T1DM group had less family problems when compared to controls (P < 0.05). In ''Problem solving'' and «General functionality», no differences were observed between the two groups. According to the YSR scale, using a logistic regression analysis with T1DM being the dependent variable, no significant difference between the two study groups was found in the following domains: withdrawal, somatic complaints, anxiety/depression, social, thought and attention problems, delinquent behaviour and aggressiveness, indicating that T1DM adolescents did not show differences in emotional status and behaviour.

Conclusions: The T1DM group seems to have less family problems and similar psychosocial health status, when compared to healthy controls. Due to cultural reasons, it seems that diabetes occurrence makes T1DM Greek patients stronger and it positively affects communication, while improving family bonding.

P-377-309

Type1 diabetes in everyday life: parent and child perspectives

J.A. Gajewski[1] & A. Malkowska-Szkutnik[1]

[1]*The Mother and Child Institute, Department of Child and Adolescent Health, Warszawa, Poland*

Objectives: The purpose of this study was to explore what are the most common problems in everyday activities related to diabetes and compare child and parent perspectives.

Methods: As part of filling out the DISABKIDS questionnaire 84 child/parent dyads were asked two open questions

(1) to describe most important limitations in daily life that are a consequence of having diabetes, and

(2) to propose methods to solve mentioned problems. Answers were analyzed in pairs, and combined into categories of similar responses. After excluding missing data 63 dyads were taken for analysis.

Results: Nineteen children did not see any specific problems related to having diabetes, and consider themselves as the same as other, healthy children. Parents of these children also often gave the same answers emphasizing that T1D do not exclude their children from living in the same way as peers. Other answers indicated that the most common problems were: being on a diet, excessive parental monitoring, insulin dosage, blood glucose monitoring, difficulties in school activity participation and lack of independence.

Conclusions: Being or feeling ill is not fixed to having diabetes in the medical sense. Being ill seems to be more related to having limitations in everyday life, and being particularly focused on chronic illness related problems in undertaking activities. In the other hand it is related to seeing oneself as equal and not different than peers. Direction of the relationship between the attitudes of parents and children requires further analysis. Distinction between illness in medical sense, and meanings of this term in social context should be taken into consideration by health professionals.

P-444-310

Parental diabetes knowledge: correlates with clinical and demographic variables

V. Mc Darby[1], P. Gallagher[1] & D. Cody[1]
[1]*Our Lady's Children's Hospital, Crumlin, Dublin, Ireland*

Objectives: To determine if parental diabetes knowledge is associated with HbA1c, duration of diabetes, age of child or method of insulin delivery.
Methods: An adapted version of the Audit of Diabetes Knowledge questionnaire (ADKnowl), designed to measure essential knowledge of diabetes, was completed anonymously by parents of children with type 1 diabetes, aged 1–18 years, during attendance at diabetes clinics over a three-month period. Information from the clinic database was included anonymously with the corresponding completed questionnaire that included the average HbA1c for the past year and non-identifier demographic information, such as age, duration of diabetes, gender and method of insulin delivery.
Results: 194 completed questionnaires (97% of parents approached) were analysed along with the corresponding HbA1c and demographic information. The average total knowledge score (TKS) was found to be 79%, with significant differences found between subsections analysed (knowledge of diabetes treatment TKS = 95%, exercise effects TKS = 89%, hypo treatment TKS = 67% and HbA1c knowledge TKS = 64%). Parental diabetes knowledge was found not to be related to HbA1c ($P = 0.328$), age of child ($P = 0.304$) or duration of diabetes ($P = 0.136$). Parental diabetes knowledge was found to be significantly associated with insulin regimen (CSII TKS = 86, non-CSII TKS = 76, $P < 0.001$).
Conclusion: Parental diabetes knowledge is positively associated with CSII, which may reflect the intensive education associated with this modality of treatment or a bias in terms of patient selection. Parental TKS was not associated with poorer HbA1c suggesting that interventions aimed at reducing HbA1c need to focus more on child diabetes knowledge and psychosocial variables. Parental TKS was also not associated with duration of diabetes, suggesting good parental retention of knowledge. Structured diabetes education should be guided by regular audit of parental knowledge.

P-507-311

Effects of carbohydrate counting method on metabolic control in children with type 1 diabetes

D. Goksen[1], S. Ozen[2], Y. Atik Altınok[2], G. Demir[2] & S. Darcan[2]
[1]*Ege University Faculty of Medicine, Pediatric Endocrinology, Izmir, Turkey;* [2]*Ege University, Izmir, Turkey*

Background: Medical nutritional therapy is important for glycemic control in children and adolescents with type 1 diabetes mellitus (T1DM). Carbohydrate counting, which is a more flexible nutrition therapy intervention for diabetes has become popular in recent years.
Objective: To investigate effects of carbohydrate counting on metabolic control, body measurements and serum lipid levels in children and adolescents with T1DM.
Subjects-methods: Patients aged 7-18 years with type 1 DM receiving flexible insulin therapy were randomized to carbohydrate counting ($n = 52$) and control ($n = 32$) groups and were followed for 2 years. Demographic characteristics, body measurements, insulin requirements, HbA1c and serum lipid levels at baseline and follow up were evaluated.
Results: At baseline, there was no statistically significant difference in the mean HbA1c values in the preceding year before the study as well as age, gender, duration of diabetes, pubertal stage, total daily insulin dose, BMI (body mass index) SDS and serum lipid values between the groups. There was no difference in BMI SDS, daily insulin requirement, total cholesterol, low density lipoprotein, and triglyceride values between groups ($P > 0.05$) during the follow-up period. Annual mean HbA1c levels of the 2nd year were significantly lower in carbohydrate counting group than the controls % 7.87 ± 1.38 vs 8.76 ± 1.77 ($P = 0.010$). High density lipoprotein levels were significantly higher in the first and 2nd years in carbohydrate counting group ($P = 0.02$ and $P = 0.043$, respectively).
Conclusion: Carbohydrate counting provides a good metabolic control in children and adolescents with T1DM without increasing BMI and insulin requirements.

P-97-312

The relationship between body mass index and body image, social support, self-concept, and locus of control in adolescents with type 1 diabetes

L.A. Kaminsky[1,2] & D.M. Dewey[2,3]
[1]*Alberta Children's Hospital, Diabetes Clinic, Calgary, Canada;*
[2]*University of Calgary, Department of Pediatrics, Calgary, Canada;*
[3]*Alberta Children's Hospital, Behavioral Research Unit, Calgary, Canada*

Objectives: To examine the relationship between body mass index (BMI) and body image, social support, self-concept, and locus of control in adolescents with type 1 diabetes and healthy comparison adolescents.
Methods: Forty-six adolescents (19 boys and 27 girls) with type 1 diabetes (mean age 15, SD = 1.6) were recruited from a diabetes clinic and 27 healthy comparison participants (14 boys and 13 girls; mean age 14.8, SD = 1.6) were recruited from an orthopedics clinic. Participants completed questionnaires that assessed body image, pubertal status, activity level, social support, self-concept and health locus of control.
Results: No significant differences were found between teens with diabetes and healthy comparison teens on the measures of body image, pubertal status, activity level, social support, self-concept, health locus of control and body mass index. Ten adolescents with diabetes and 8 comparison adolescents had BMI's in the overweight range. The body image scores of adolescents with diabetes who had BMI's in the overweight range (greater than the 85th percentile) were not significantly different compared to teens who had BMI's in the normal range. However, healthy comparison teens with BMI's in the overweight range had significantly less positive body image compared to their normal weight peers ($t = 2.14$, $P = 0.045$). Correlation analyses for the entire sample found that higher BMI was associated with less positive body image ($t = -0.26$, $P = 0.047$), lower self-esteem ($t = -0.26$, $P = 0.027$) and less social support ($t = -0.30$, $P = 0.012$) in boys but not girls.
Conclusions: Teens with diabetes in this sample who were in the overweight range continued to have a healthy body image. However, BMI levels were associated with a less positive body image, and lower self-esteem and social support, in the full sample particularly for boys. This study highlights the need for research with larger samples that examines body image in both boys with diabetes and typically developing boys.

P-106-313

Self-perception of coping ability in adolescents with diabetes mellitus type 1

N. Maas[1], A. Roeleveld-Versteegh[2] & A. van Baar[3]
[1]*Catharina Hospital, Medical Psychology, Eindhoven, Netherlands;* [2]*Catharina Hospital, Eindhoven, Netherlands;* [3]*University of Utrecht, Utrecht, Netherlands*

Objectives: The purpose of this study was to determine whether the level of satisfaction of adolescents with type 1 diabetes with their own coping ability is related to their coping styles, as well as to behavioural or emotional problems and metabolic control.
Methods: A sample of 151 adolescents aged 12-18 years (mean 14.9 ± 1.7 years) with type 1 diabetes indicated to what extent they were satisfied with their ability to cope with their disease. They also completed questionnaires on coping styles (CODI Coping questionnaire), behaviour problems (Youth Self Report) and depressive feelings (Children's Depression Inventory).
Results: Overall the majority of adolescents perceived their coping style as effective: 72.3% of the adolescents valued their own coping ability as successful or very successful. A higher level of satisfaction with their coping ability was associated with an accepting coping style, less depressive feelings and a better metabolic control of the adolescents. The CDI, an accepting coping style and the level of metabolic control accounted for 43.2% of the variance in the satisfaction of the adolescents with their coping ability. In addition 40.9% of the variance in depressive symptoms was explained by an emotionally reactive coping style as well as by the adolescents' level of satisfaction with their coping ability.
Conclusions: (i) Adolescents with T1DM, who evaluated their coping abilities as successful, showed a better metabolic control and less behaviour problems and depressive feelings.
(ii) These adolescents used a coping style based on acceptance and less on avoidance, emotional reactions and wishful thinking.
(iii) Information on maladaptive coping styles may be useful to identify adolescents in need for extra support. In addition the satisfaction of the adolescents of their own success or failure in coping with their disease can be an important principle guiding counselling and treatment.

P-132-314

Pneumococcal immunisation uptake in children with type 1 diabetes mellitus

A. Anuar[1,2], D.F. Kelly[3,4], A.J. Pollard[3,4] & J.A. Edge[1]
[1]*Oxford Children's Hospital, Paediatric Diabetes, Oxford, UK;* [2]*Faculty of Medicine, University of Malaya, Paediatric, Kuala Lumpur, Malaysia;* [3]*University of Oxford, Department of Paediatrics, Oxford, UK;* [4]*NIHR Oxford Biomedical Research Centre, Oxford, UK*

Introduction: UK Department of Health policy recommends that children with diabetes should receive pneumococcal vaccination. Pneumococcal Conjugate Vaccine (PCV) was introduced into the childhood immunisation programme in 2006. All children diagnosed with diabetes who are under 5 years of age should have received a course of primary immunisation with PCV. In addition children aged 2 or over are recommended to have a single dose of 23-valent pneumococcal polysaccharide vaccine (PPV). Previous studies have indicated that compliance with these recommendations may be poor in this population. This audit was performed to analyse the compliance with these recommendations in children with type 1 diabetes mellitus (T1DM) in Oxfordshire.
Methods: All children registered in the Oxfordshire Paediatric Diabetes database were included in the audit. Pneumococcal immunisation data was collected from the Child Health Information System (CHIS) under the Clinical Audit Oxford University Hospital NHS Trust approval.
Results: There were 298 children in the diabetes service. 268 had data available from CHIS. The age range of the cohort was 3 - 18 years, median 13.0 ± 3.4 years. 102 (38%) children with T1DM had received pneumococcal vaccine. Of children young enough to have received a primary course of pneumococcal immunisation as infants (i.e < 2 years old in September 2006) only 2/29 (6.8%) had not received a pneumococcal vaccine. For children older than this (born prior to September2004), 163/239 (68.2%) had no record of any pneumococcal immunisation despite the Department of Health recommendation that a single dose of PPV should be administered to all individuals with T1DM. The remaining 76/239 (32%) children who had been immunised had received PPV.
Conclusion: Despite the recommendations and annual reminders from the diabetes team, the majority of children had not received a pneumococcal vaccine. Diabetes teams and general practitioners could do more to follow recommendations.

P-60-315

Juvenile diabetes in Liberia - spreading the word

J. Gbayeah[1], C. Somah[1], R. Cordill[1] & J.E. von Oettingen[2,3]
[1]*Ganta Methodist Memorial Hospital, Ganta, Liberia;* [2]*Massachusetts General Hospital, Pediatrics, Boston, USA;* [3]*Harvard Medical School, Boston, USA*

Background: Many children in Liberia do not have access to health care. Diagnostic and treatment tools are frequently unavailable. Medical provider's knowledge about type 1 diabetes is limited and many children likely remain undiagnosed.
Methods: A diabetes program for adults and children was established in a rural part of Liberia, at Ganta Methodist Memorial Hospital (GMMH) in Nimba County in 2010. Registered Nurses were trained to be Diabetes Nurse Specialists by US diabetes nurses through a World Diabetes Federation grant using a 'train the trainer' model. Community awareness and education was initiated through a weekly radio call in talk show, 2 monthly support groups, and a community outreach program.
Results: Three trainings have been conducted for community clinic providers, and GMMH is now established as a county referral center. Diabetes clinics are held daily at GMMH, which now provides for 300 patients, including 30 children and youth with type 1 diabetes. A patient registry has been introduced. Since 2010, Life for a Child supports all patients under the age of 25 years. Monthly support groups provide general information for patients and their support person. During the weekly radio talk show, the diabetes nurses answer callers questions from patients, their families, and members of the community on a specific topic relating to various aspects of diabetes. More than 3000 people have attended awareness and screening clinics. Two diabetes support groups have been established with about 10 adolescents attending each month.
Conclusion: Establishing an infrastructure for referral is key to building juvenile diabetes programs in resource limited settings. Community outreach and innovative programs such as radio talk shows help to increase community awareness and patient education. More financial resources are needed to support existing diabetes programs, build further programs, and improve medical care for children with type 1 diabetes.

P-64-316

The impact of a specialized health team with protected time for patient education on diabetes management and metabolic control in children with type 1 diabetes (T1D)

R. Roman[1,2] & S. Ruiz[1]

[1]*Antofagasta Regional Hospital, Pediatric Department, Antofagasta, Chile;* [2]*University of Antofagasta, Antofagasta, Chile*

The Explicit Guaranties Plan (GES) was established in Chile to deliver standard, opportune, efficient and low cost medical attention to all T1D patients, without discrimination. Since 2005, every child receives by law Insulin (I) as prescribed (NPH, R, rapid analogs, glargine (Glarg) and determir), a glucose meter, four blood glucose strips/day, syringes, and glucagon. Whereas, despite the finacial resources availability, diabetes care does not meet optimal standards all over the country. The aim of the study is to measure the impact of a T1D education program, established by a Pediatric Endocrinologist and a previously capacitated registered nurse assigned with exclusive time to develop the program. The study was performed in a Public Hospital located 1400 km from the capital where DM specialists were not available until 2011. Patients were educated in CH counting, I sensitivity, basal/bolus I therapy, and I adjustments to meet target Hba1c. Subjects had at least monthly visits with the trained nurse and all were offered to switch to Multiple Daily Injections (MDI). The group increased from 34 in 2010 to 49 in 2012 (adding 5 new onsets and 10 reenrolled children) (ongoing puberty in 61% and 69% respectively). Results are shown as mean and SD and the percentage of subjects in each category.

Using the same therapeutic arsenal available in 2010, mean HbA1c was improved during the last year. This study shows the beneficial impact of the specialized human resource with protected time for education to improve DM management- The presence of specialized health teams in extreme areas of the country could help GES plan to achieve the universal access to equal health care in our country.

Table: Results years 2010 and 2012

Year	Age	DM duration	HbA1c	HbA1c	MDI	CH count	I sensit	Basal I (%)
	(Year)	(Year)	(%)	>9% (%)	(%)	(%)	(%)	NPH/Glarg
2010	11.7 ± 2.5	2.9 ± 2.4	10.1 ± 2.5	29	23	6	30	74/8
2012	11.3 ± 3.4	3.1 ± 2.3	8.7 ± 0.6	28	73	47	75	16/69

Poster Tour 4 - Diabetes Care & Education & Psychosocial Issues

P-76-265

The use of insulin analogues in the management of diabetes mellitus in infants in a resource limited setting: Botswana's experience to-date

D. Joel[1] & S. Nchingane[1]
[1]*Princess Marina Hospital, Paediatrics, Gaborone, Botswana*

The management of diabetes mellitus in infants in a resource limited setting is a challenge. Unlike older children, infants are unable to follow strict meal times which are essential for the diabetes management using twice daily biphasic insulin regimen.Additionally,it's not possible to quantify amount taken in breastfed infants.The use of multiple daily insulin analogue injections in infants in Botswana has never been reported.

Objectives: The objective of our study is to report on the outcomes in three infants who were treated with multiple insulin analogue injections following the initial trial with twice daily biphasic insulin injections.

Methods: This is a case report on three breastfed infants, newly diagnosed with diabetes mellitus, who were admitted to a tertiary referral hospital in Gaborone, Botswana. At the time of the diagnosis, one infant was 2 months old and the other two were 11 months old. They all presented with polyuria, polydipsia, polyphagia, lethargy, and two infants were in diabetic keto-acidosis (DKA). Following the initial standard management with intramuscular regular human insulin/ intravenous fluids and the resolution of symptoms, they were switched to sub-cutaneous twice daily biphasic insulin. Based on the level of glycaemic control on the above regimen, the long acting insulin analogue(insulin glargine)/multiple daily injections with rapid acting insulin analogue(insulin aspart) were introduced and glucose monitoring was continued.ResultsThere was persistent glucose elevation alternating with low blood glucose readings most of the time in all three infants on biphasic insulin regimen. Following the switch from bi-phasic insulin regimen to insulin analogues, the glycaemic control improved after 9-12 days of treatment and the patients were all discharged home.

Conclusion: Basal insulin analogues and multiple daily insulin analogues gave good outcomes in glycaemic control in breastfed diabetic infants, compared to twice daily biphasic insulin.

P-472-268

Establishing a novel structured program after evaluation of transition in young people with diabetes

M.J. Hauschild[1], S. Stoppa-Vaucher[1], M.-P. Aquarone[1] & C. Belotte[1]
[1]*University Hospital, CHUV, Lausanne, Pediatric Endocrinology and Diabetology Unit, Lausanne, Switzerland*

Objectives: Transition from pediatric to adult diabetes care needs continuous surveillance in order to assist the shift from parental to professional guidance, to insure appropriate diabetes self-management, and to prevent loss of follow up. Individual programs tailored to the regional specificities might be needed to ensure optimal guidance strategies.

Methods: We conducted a survey of young adults that transitioned from specialized diabetes care from a pediatric university structure to adult diabetes care between 1990 and 2010. Psychosocial factors and satisfaction of transition care were evaluated by questionnaire.

Results: Thirty-nine out of 173 (22.5%) questionnaires could be evaluated (responders: R). Mean age at transition was 17.8 years (13 -19). Mean age at study time was 23 years (17-31). Mean age of non-responders (NR) was 17.5 years (14-20) at transition and 22.6 years (17-34) at study time. HbA1c (mean 8.6% (7 - 13.5) (R) vs 8.9% (5.2-15.2) (NR)) and diabetes duration (8.1 years (2.1 - 14.8) (R) vs 6.45 years (2.3 - 16.1) (NR)) did not differ significantly between R and NR at transition. 89.2% of R indicated regular (>3 per year) visits at a diabetes specialist, and 81.6% were followed in private practices. 35.6% indicated a feeling of absent, and 34.2% of insufficient preparation of transition by the pediatric team. 23.7% of patients wished the presence of a pediatric specialist at the first adult consultation.

Conclusion: Our study shows that even in a well-organized health system, transition from pediatric to adult care needs careful planning. Since 2011 we have introduced a structured program including a transition nurse aiming to guide and to maintain contacts of patients and pediatric and adult caregivers in hospital and private structures. This program aims to ameliorate patient preparation, focusing on responsible diabetes self-management, as well as interaction between pediatric and adult caregivers.

P-456-269

Oral health in children with type 1 diabetes: study in a group of 40 children

C. Peyraud[1], J. Peyraud[2,3], C. Choleau[3], M.J. Boileau[1], T. Planes[1], Y. Delbos[1] & J. Lebreton[1]
[1]*Faculté d'Odontologie, Université Bordeaux Segalen, Bordeaux, France;* [2]*Hôpital Robert Boulin, Pediatric Diabetology, Libourne, France;* [3]*Aide aux Jeunes Diabétiques (AJD), Paris, France*

Introduction: The impact of type 1 diabetes on oral health is often overlooked. So, the objective of our study is to evaluate the state of oral health in children with type 1 diabetes.

Methods: This is a study in a group of 40 children aged 8-14 years (mean age: 11.28 ± 1.34 years) during an AJD summer camp. Medical data, oral health parameters (DMF, GI, OHIS) and salivary parameters (flow, pH, buffering capacity and proportion of Streptococcus mutans and Lactobacillus) were collected. Knowledge on the links between oral health, diabetes mellitus and oral health behaviors were also analysed.

Results: The mean HbA1c was 8.0 ± 0.97%, the average duration of diabetes was 5.92 ± 2.75 years. The oral health status of our sample is generally good: food is not cariogenic and oral hygiene habits are correct. Concerning the level of caries disease, DMF index average is 0.80 ± 1.38 and no child has a very high total microbiological index. The gingival index average is 0.50 ± 0.54. However, these results should be tempered, children with HbA1c ≥7.5% have significantly more gingivitis, lactobacilli and total bacteria. Children with diabetes duration more than 5 years have significantly decreased their salivary flow. These results suggest an oral health status worse in these subpopulations. Only 17.5% of children have a level of knowledge about the links between oral health and diabetes mellitus ''acceptable''. They have significantly less gingival inflammation with a better level of oral hygiene.

Conclusion: Our study highlights the need to strengthen education on oral complications of diabetes and promote good behavior in terms of oral health. Support oral should be

systematically integrated in the therapeutic education of young people with diabetes. This is to improve child health, as future adult, both in terms of oral, but also as regards of the occurrence of complications related to metabolic instability which may be favored by oral infections.

P-437-270

Affective dysregulation bring to worse glycemic control and more eating disorders in adolescents with type 1 diabetes

A. Scaramuzza[1], M.M. Grazzini[1], L. Nicora[1], S. Vaccari[2], A. Gazzarri[1], A. Bosetti[1], F. Platerote[1], E. Giani[1], M. Macedoni[1], L. Musetti[2], C. Musetti[2] & G.V. Zuccotti[1]

[1]*University of Milano - Luigi Sacco Hospital, Pediatrics, Milano, Italy;* [2]*University of Milano - Niguarda Hospital, Pediatric Neurology, Milano, Italy*

Objective: Few data exist regarding the influence of affective dysregulation, if any, on glycemic control and eating disorders in adolescents with type 1 diabetes (T1D). The aims of our study were to investigate 1) psychological profile of adolescents with T1D according to glycemic control evaluated as mean HbA1c; 2) any relationship between glycemic control and affective dysregulation; 2) possible association between glycemic control and eating disorder.

Methods: We enrolled 71 patients, aged 12-22 years (mean 17.5 ± 3.0 years) with T1D from 1 to 18 years (9.8 ± 4.8 years), BMI 22.9 ± 3.7 kg/m^2, using insulin pump therapy or multiple daily injections for more than 6 months (insulin requirement 0.86 ± 0.27 U/kg/day, HbA1c 8.3 ± 0.9%). Each patient undergo 3 specific validated questionnaires (EDI-3, EAT-26 and PANAS). Subsequently, patients were evaluated according to metabolic control and stratified into 3 groups: good (HbA1c < 7.5%), fair (HbA1c 7.5-9%), and bad (HbA1c > 9.1%).

Results: Data are shown in the table. No difference has been observed among 3 groups regarding age, disease duration and BMI, making the groups comparable. About EDI-3, patients with higher values of HbA1c showed the worse scores and the higher degree of affective dysregulation. No significant difference has been observed about EAT-26, underlying the fact that in adolescents with T1D usually do not have anorexic behaviour but mostly binge eating disorders. No depressive and anxiety mood has been observed as cause of worse glycemic control.

Conclusion: Worse glycemic control (HbA1c >9.1%) seems to be associated with a greater risk of overall psychological maladjustment, and a greater risk of eating disorders. The scales more compromised are linked to affective dysregulation, and this is a new finding. This mean that if we want to ameliorate glycemic control and lower eating disorder frequencies in patients with T1D we have to work first on the emotional well-being.

P-433-271

Comparison of glycemic control and quality of life in Danish children on continuous subcutaneous insulin infusion or multiple daily injections

N.H. Birkebaek[1], L.J. Kristensen[2], A.H. Mose[1] & M. Thastum[2]

[1]*Aarhus University Hospital at Skejby, Department of Pediatrics, Aarhus, Denmark;* [2]*Aarhus University, Department of Psychology, Aarhus, Denmark*

Objective: Reports on glycemic control and quality of life vary in existing studies of children on continuous subcutaneous insulin infusion (CSII) or multiple daily injections (MDI). Some studies suffers from a short study period or a small study population. We have compared glycemic control and quality of life (QoL) in a large group of Danish children on CSII or MDI.

Methods: A population of 765 children and adolescents aged 8-17 years and their parents were recruited through the Danish Registry of Childhood Diabetes; 315 children received CSII and 450 MDI. HbA1c was analysed centrally. Parents and children completed the PedsQL generic and diabetes module.

Results: Mean HbA1c was higher in the MDI group compared with the CSII group (8.2 vs 7.9) ($P < 0.01$). Mean HbA1c was higher in the CSII group treated more than one year compared with the CSII group treated less than one year (8.0 vs 7.6) ($P < 0.01$), while no such difference based on duration of treatment was found in the MDI treated children. The generic QoL of the child as assessed by the parents was better in the SCII treated group ($P < 0.01$), and diabetes related worry was lower compared to children receiving MDI ($P < 0.01$). The generic QoL as assessed by the children was not different in the treatment groups the first year after initiation of treatment, while generic QoL was significantly better in children on SCII longer than one year. Children's diabetes-related worry was independent of treatment modality.

Conclusion: HbA1c was lowest in children on CSII, but HbA1c increased when receiving CSII for more than one year. It seems as if parents contribute a more beneficial effect of SCII treatment on the QoL of the child, compared to the self-report of the child.

P-421-272

Growing up in safety: intervention at schools attended by children with type 1 diabetes

M. Dingle[1], M.-J. Afonso[2], M. Barradas[2], D. Matos[1], A. Pereira[2], R. Pina[1] & J.-F. Raposo[3]

[1]*APDP - Diabetes Portugal, Youngsters' Department, Lisbon, Portugal;* [2]*APDP - Diabetes Portugal, Nutrition Department, Lisbon, Portugal;* [3]*APDP - Diabetes Portugal, Lisbon, Portugal*

Objectives: Diabetes Mellitus is one of the most frequent chronic diseases in children at school age. In the proper setting and adequately treated, children may and should have a completely normal school and social life and prevent late diabetes complications. The reason for conducting training sessions at schools arose from the needs of school staff to acquire knowledge and strategies on how to deal with children with diabetes. Portuguese Diabetes Association has developed this intervention project at schools, with the support of National Health Ministry. The aim was to improve social integration and network support of children with Type 1 diabetes in school environment.

Methods: The participants were the staff of schools attended by children with diabetes. We planned the educational sessions with information on Type 1 diabetes using interactive methodology. The school staff and parents filled in a questionnaire at the beginning and three months after the session.

Results: The intervention was developed at 26 schools having 28 children with diabetes. 269 adults of the school staff and 282 children without diabetes attended the sessions. The analysis of the questionnaires showed that hypoglycaemias were a major concern: 80% of the children had hypoglycaemias at school, but 70% of the school staff did not know how to manage hypoglycaemia. After the training sessions 85% of the staff had gained knowledge and felt confident to treat them. We noticed an improvement on satisfaction and well-being of all participants involved. All adults referred that more information about diabetes improved children integration at school.

Conclusions: This training project of integration of children with diabetes at school promotes adequate strategies to overcome difficulties. It raises awareness of the entire social structure that surrounds the child, including other children.

P-387-273

Management plan designed to optimise care of adolescents with poor glycaemic control HbA1c >10%

M. Noud[1], K. Shann[2], D. Irvine[3], S. Crook[4], M. Walker[5], V. Greene[6], A. Franklin[2], S. Sudeep[1], J. Matthews[1], M. Velasco[1] & T1DM >10 Collaborative, Queensland Health

[1]*Mater Children's Hospital, Brisbane, Australia;* [2]*Royal Children's Hospital, Brisbane, Australia;* [3]*Gold Coast Hospital, Southport, Australia;* [4]*Townsville Hospital, Townsville, Australia;* [5]*Bundaberg Hospital, Bundaberg, Australia;* [6]*Northlakes Community Health Centre, Caboulture, Australia*

Introduction: In Queensland the mean HbA1c of young people with T1DM has been high (8.9%) (1998-2007) with 20% with HbA1c persistently >10%. A needs analysis was performed and a Management Plan developed to assist diabetes teams to optimise care of young people with poor glycaemic control.
Methods: The needs analysis of 7 diabetes teams across Queensland in 2010 revealed that staff burnout and lack of expertise in dealing with psychosocial co-morbidities were the main barriers to providing best practice care. These teams provided care for 1113 young people with diabetes, mean age 11.9 ± 4.0 years, duration 4.3 ± 3.7 years.
Results: A multidisciplinary health professional team developed the Management Plan consisting of; Handbook, Flow Chart and Action Plan. This plan allowed teams to develop a systematic process and using the Flow Chart the case coordinator helped the team to: gather information, formulate the problems, and develop an appropriate intervention. Frequent team discussions, a thorough chart review and more frequent patient contact promoted patient centred multidisciplinary care. The case coordinator together with the family developed the Action plan that encouraged goal setting and focused on self-management. The Management Plan was evaluated. 62% of the health professionals felt that following the plan had made a positive difference assisting them in assessment and management of psycho-social problems. 123 young people 12-18years with HbA1c >10% were eligible for the Management Plan. Only 48 had the Plan implemented. Health professionals identified barriers such as lack of time and resources to the implementation of the Management plan.
Conclusion: The Management Plan provided a framework and a consistent process for caring for young people with complex psychosocial problems and HbA1c >10%. This enabled multidisciplinary team members to collaborate with the family to develop strategies to improve outcomes for young people with T1DM.

P-206-274

What is the association between errors in carbohydrate counting and postprandial glycaemic control in children using intensive therapy?

C.E. Smart[1,2], B.R. King[1], P. McElduff[3] & C. Collins[2]

[1]*John Hunter Children's Hospital, Department of Endocrinology and Diabetes, Newcastle, Australia;* [2]*University of Newcastle, Nutrition and Dietetics, Newcastle, Australia;* [3]*University of Newcastle, School of Medicine and Public Health, Newcastle, Australia*

Objectives: Assessing the impact of common errors in carbohydrate estimations on postprandial glycaemia is an important clinical issue and one that has not been rigorously evaluated. Previously we demonstrated 10 gram variations in CHO quantity do not adversely impact postprandial control. We have also reported that 27% of meal estimations by families are inaccurate by greater than 10 g CHO. The aim of this study was to define the bounds in carbohydrate estimation which result in stable postprandial glycaemia.
Methods: For this prospective, randomised clinical trial, 34 children and adolescents using insulin pumps or multiple daily injections consumed five test breakfasts of varying carbohydrate quantities (40, 50, 60, 70 and 80 g CHO), but equivalent fat, protein and fibre contents. The preprandial insulin dose was the same for each meal, based on the subjects usual insulin: CHO ratio for 60 g CHO. The primary outcome measure was the 3 hour postprandial glucose profile as assessed by continuous glucose monitoring.
Results: One in three children (31%) consuming the 40g CHO meal had hypoglycaemia compared with none on the 60 g meal. 80% of all episodes of hypoglycaemia occurred between 2 and 3 hours. Postprandial glucose excursions were lower with the 50 g CHO meal, but there was no increase in the risk of hypoglycaemia. The extra 10 g of CHO in the 70 g meal had no significant effect on glucose levels, but the 80 g CHO load led to significant hyperglycaemia and an increased likelihood of glucose levels reaching 12 mmol/l or more ($P < 0.001$).
Conclusions: Children using intensive insulin therapy do not experience significantly different postprandial glucose excursions if they miscalculate a 60 g CHO meal by 10 g carbohydrate, but a 20 g error significantly increases hypoglycaemia and hyperglycaemia. To calculate mealtime insulin in order to maintain postprandial control, CHO estimations should be within 10 g or approximately 20% of the actual meal CHO.

P-148-275

What are the clinical characteristics of patients with high HbA1c levels?

L. Hanberger[1], U. Samuelsson[1] & K. Åkesson[2]

[1]*Division of Pediatrics, Department of Clinical and Experimental Medicine, Linköping, Sweden;* [2]*Pediatric Clinic, County Hospital Ryhov, Jönköping, Sweden*

Objectives: Children and adolescents with high HbA1c values have increased risk for late complications. Clinical characteristics of patients with different HbA1c levels were explored.
Methods: Data from 24 553 visits (5465 patients with T1D duration >3 months, 47% girls) registered in the Swedish Childhood diabetes registry, SWEDIABKIDS, during year 2011 were analyzed regarding HbA1c, insulin regimen, age, diabetes duration, BMI-SDS, smoking habits, physical activity, gender, episodes of hypoglycemia and differences between centers. HbA1c levels (mmol/mol) were divided in quartiles: < 57, 57 - 62, 63 - 71, >72. Anova and Chi square were used to compare differences.
Results: Twenty nine percent of the boys and 26% of the girls had HbA1c values within the 1st quartile compared to 25% and 29%, respectively in the 4th quartile, $P < 0.001$. Many children with high levels of HbA1c (4th quartile) had no physical activity (41%). Corresponding figure for the 1st quartile was18% ($P < 0.001$). A high proportion of smokers was found in the 4th quartile (65%) compared with the 1st quartile (6%), $P < 0.001$. Children in the 4th quartile also had higher insulin dose, longer duration and higher age than children in the 1st quartile. Children in the 4th quartile reported 194 (25%) of all the hypoglycemic episodes compared to 213 (28%) in the 1st quartile. At one centre 11% of the children had HbA1c values in the 4th quartile compared to 50% at another centre. On the

other hand, one centre had a majority of the children in the 1st quartile (70%) while one centre had very few (17%), $P < 0.001$.
Conclusions: Characteristics of children and adolescents with high HbA1c levels are female gender, low physical activity and being a smoker. The distribution of HbA1c values in quartiles for centres showed great differences thus one way to reach a good and acceptable HbA1c value is to be treated at a centre with a high proportion of children with low HbA1c values.

Poster Tour 5 - Diabetes Care & Education & Psychosocial Issues

P-200-286

Growth monitoring in management of T1DM children from low-sosioeconomic status

A.G. Moelyo[1] & A. Marfuah[1]
[1]*Sebelas Maret University Moewardi Hospital, Child Health Department, Surakarta, Indonesia*

Background: Children with type 1 diabetes mellitus (T1DM) have a risk of growth disturbance in a long period. Comprehensive management of children with T1DM must monitor not only glycemic control and other complications, but also growth and development. In Indonesia, problems for growth monitoring due to patient compliance, health facilities, socioeconomic status and education level of the family.
Objectives: To understand the achievement of management on growth in Moewardi Hospital's T1DM children with low socioeconomic status.
Methods: A retrospective study was performed from 2009 until May 2012. Subjects of this study are T1DM children in Moewardi Hospital Surakarta, Indonesia. Only family with low socioeconomic were enrolled. Data were collected based on visit date, age, sex, body weight, body height, body mass index, A1c level, insulin regimen and total daily dose.
Results: There are 5 subjects with T1DM, 4 girls and 1 boy, 1 subjects are covered by government insurance for poverty people, 2 subjects with company insurance, and 2 subjects with no insurance coverage. Regimen insulin are BID in 3 subjects and basal bolus in 2 subjects. Four subjects are in pubertal period (9-13 years old). Mean growth rate of pubertal subjects (4) are 3.4 + 1.7 cm/year. Mean increasing body mass index are 1.98 kg/m^2/year. One subject become obese. Mean dose of insulin is 0.98 ± 0.4 Unit/body weight/day. Mean HbA1c level is 11.1 ± 2.0%.
Conclusion: Growth of T1DM children from low-socioeconomic status is poor. The glycemic control is also poor. Low-socioeconomic status may impair goal of T1DM management.

P-62-288

E-health: stipulation of mobile phone technology in adolescent diabetic patient care

N. Kumar[1], R.A. Khan[1], P. Kumar[2] & V.P. Sharma[3]
[1]*Babasaheb Bhimrao Ambedkar University, DIT-SIST, Lucknow, India;* [2]*Jawaharlal Nehru University, DCB-SLSc, New Delhi, India;* [3]*CSIR-Indian Institute of Technology, DTD, Lucknow, India*

E-health (Electronic health) is becoming prime target of wireless communication technology and especially Mobile phone is contributing a significant outcome to improve the health of adolescent diabetic patients (ADPs). The objective of this study was to test whether adding mobile phone application for patient care compared with control cases would reduce Glycated Hemoglobin (HbA1c). Fifteen ADPs (study cases, n = 15) were selected for mobile phone coaching through text messaging, chatting or calls to consultants. Simultaneously, ADPs of the control site (n = 12) were continued with their usual diabetes health care from consultants. Primarily, ADPs were enquired for their demographic and social characteristics, frequency of mobile phone use, general health information and diagnosis of type 2 diabetes. Further the level of Hb1Ac, in both the groups, was measured in a regular interval of 3 months upto 15 month. As a final point, it was observed that Hb1Ac level was decreased in both the groups of patients. Among ADPs, those were using mobile phone for diabetic care, the mean Hb1Ac level (6.952 ± 0.2862) was found lower than the control (7.318 ± 0.1894). The differences were small but a trend of positive improvement was observed among ADPs using mobile phone. This shows that e-health may contribute to prevent the complexities in medical care and the cautious use of Mobile phone technology would be an asset for self care management in ADPs.

P-43-289

Using self monitoring of blood glucose to improve understanding and self management of diabetes in children and young people with type 1 diabetes in a routine clinical setting

J. Yong[1], P. Holland[1], K. Harron[2], I. Abbey[1], F. Campbell[1] & R. Parslow[3]
[1]*Leeds Teaching Hospitals Trust, Paediatric Diabetes, Leeds, UK;* [2]*University College London, Centre for Paediatric Epidemiology and Biostatistics, London, UK;* [3]*University of Leeds, Leeds, UK*

Introduction: The strong correlation between HbA1c and blood glucose (BG) has been recognised in many studies. We investigated this relationship using BG data from 119 children with diabetes, to better understand factors affecting HbA1c and characteristics of children with good versus poor control.
Methods: BG data was obtained on 119 children over a 1 month period and on a subset of 43 children over 3 consecutive months using the Diasend system (Aidera, Sweden). HbA1c was obtained at the beginning and end of the 3 month period. Linear regression was used to assess the relationship between HbA1c and BG and any additional effects of BG variability or age.
Results: Our model confirmed the linear relationship between HbA1c and BG. Each additional 1 mmol BG corresponded to an increase of 0.35 (95% CI 0.3-0.4) HbA1c%. Age had a significant effect on HbA1c after adjusting for average BG (P = 0.003) - for an average BG of 10mmol, predicted HbA1c measurements were 7.8% for age eight and 8.1% for age fifteen. The 3-month data showed a significant relationship (P = 0.027) between absolute change in HbA1c and BG variability (standard deviation). Children with more variable BG were more likely to have a larger change in HbA1c. Children with poor control (HbA1c >9.5%) tended to take fewer BG measurements, have more variable measurements, and have a peak measurement between 6-8pm compared with those with good control (<7.5%).
Conclusion: Routinely downloading BG meter readings has been well accepted by parents and children and has become an essential part of clinical consultation. It allows HbA1c to be expressed as the more easily understood average BG, enables children to visualise and discuss their data, and identifies areas in which to target improvements. We recommend that downloads and assessment of average BG becomes routine in clinic.

P-402-290

The education process when a child is diagnosed with type 1 diabetes - an education for life

L. Jönsson[1], I. Hallström[2] & A. Lundqvist[1]
[1]*Lund University, Department of Health Sciences, Lund, Sweden;* [2]*Lund University, Department of Health Sciences/The Swedish Institute for Health Sciences, Lund, Sweden*

Objectives: Worldwide, type 1 diabetes is one of the most common endocrine and metabolic conditions in childhood. In Sweden according to national practice guidelines, the child newly diagnosed with type 1 diabetes and its family remains at the hospital for about one to two weeks. There is limited knowledge about how a diabetes team handles a child and its family from admission to discharge therefore the aim was to seek a deeper understanding of how the diabetes team's education process works during hospitalization.
Methods: Qualitative focus-groups interviews with three diabetes teams from different paediatric hospitals in the south part of Sweden were conducted. Textual data, from transcribed audiotapes, was analysed using a qualitative content analysis.
Results: The results show that achieving a status of self-care on the part of the patient is the main goal of the diabetes education programme. Part of the programme is aimed at guiding the child and its parents towards self-help through the means of providing them with knowledge of the disease and its treatment. The whole family have to understand the need for cooperation in the education process. To do this requires an understanding, by the diabetes team, of the individualities of each family in order to gain an overall picture.
Conclusions: The results of this study show that the diabetes education programme is carefully planned for each individual family using the internationally recommended clinical guidelines. Achieving the families' willingness to assist in the self-care of the child care is the goal of the parent education process. To achieve this, the paediatric diabetes team immediately start the process of educating the family using a programme designed to give them the necessary knowledge and skills they will need to manage their child's type 1 diabetes at home.

P-314-291

Psychologic and psychosomatic approach in adolescents with type 1 diabetes (TIDM)

E.-E. Gkika[1], C. Synodinou[2], C. Bartsocas[1] & A. Qadreh[1]
[1]*Mitera General Hospital, Pediatrics, Athens, Greece;* [2]*University Panteion of Athens, Department of Psychology, Athens, Greece*

Objectives: The aim of this study was to evaluate the psychological restructure following disease appearance. The presence of a chronic disease during the period of adolescence creates many questions about the person's behavioral psychic structure particularly about the way that this emotional structure evolves by living with the disease.
Methods: The research sample consisted of 104 adolescents (between 11 and 21 years old) with TID diabetes and 146 healthy adolescents, who accepted voluntary, participation. This project was held November 2008 through September 2010.
Testing included the T.A.T. (Thematic Apperception Test), Self Image Questionnaire for Adolescents S.I.Q.A., and a structured clinic interview.
Results: Most of adolescents (43.3%), presented diabetes during childhood. Adolescents with diabetes appearance in childhood seemed more able and more accommodating and with much more self-confidence as compared with adolescents whose diabetes appeared in infancy or in adolescence. The longer the duration of diabetes the less negative effect in the body image.
Conclusion: The *overvalue* that gives the adolescent to the appearance of his diabetes, leads to organic and body disorganization, consists of emotions, unconscious representations and defenses mechanisms that concludes to psychic, mental re-organization. The way the adolescents face their diabetes in the begging of illness is related to problems in later stages. This will contribute in the recognition of those adolescents that needs support and advisory intervention.

P-227-292

Fathers' involvement in their child's diabetes care - seen from a health promotion perspective

Å. Boman[1], L. Povlsen[2], E. Dalhborg-Lyckhage[1], R. Hanas[3] & I. Borup[2]
[1]*University West, Division of Caring Sciences, Trollhattan, Sweden;* [2]*Nordic School of Public Health NHV, Gothenburg, Sweden;* [3]*NU Hospital Group, Dept. of Pediatrics, Uddevalla Hospital, Uddevalla, Sweden*

Background: The involvement of fathers of children with diabetes type 1 in the child's daily life has been found to have an essential impact on the outcome of the disease management. Paternity discourses in Sweden have changed towards a nourishing and caring fatherhood, and something approaching hegemonic child-oriented masculinity has been argued for.
Objectives: The aim of this study was to analyze how fathers of children with diabetes type 1 understand their involvement in their child's daily life and to discuss their perceptions from a health promotion perspective.
Methods: The sample was 16 Swedish fathers of children with diabetes type 1, all highly involved in the child's daily life. Data were collected through interviews performed February 2011 to February 2012. Manifest and latent content analysis was used.
Results: Two interacting themes were identified: the inner core of general parental involvement and the additional involvement based on the child's disease. Two categories underpinned the general parental involvement: the fathers' prioritization of family life and the fathers being consciously involved in raising the child. The fathers promoting and controlling the child's health and the fathers promoting and enabling the child's autonomy was found to be the base for their involvement due to the child's disease.
Conclusions: From the present study, we conclude that the quality of the fathers' involvement is essential to the disease outcome and that it is important for pediatric diabetes teams to pay close attention to the quality of fathers' involvement in order to promote the child's health and well-being.

P-195-293

Evaluation of vitamin D supplementation in children and adolescents with type 1 diabetes mellitus and their siblings

M.H. El-Samahy[1], S.M. Farid[1], M.O. El-Maraghy[2] & R.M.H. Zeitoun[1]
[1]*Ain Shams University, Pediatrics, Cairo, Egypt;* [2]*Ain Shams University, Clinical Pathology, Cairo, Egypt*

Objectives: Low vitamin D level was found to have a negative impact on beta-cell function in patients with type 1 diabetes mellitus (T1DM). However the effect of vitamin D supplementation in both diabetics and their sibling is still controversial. This study aims to evaluate vitamin D level in patients with T1DM and their non diabetic siblings and to assess the effect of vitamin D supplementation to those with established vitamin D deficiency on blood glucose level, beta-cell function measured as C peptide level and metabolic control.
Methods: C peptide and serum vitamin D levels were assayed in 60 children and adolescents with T1DM and in 30 of their non-diabetic siblings.

Results: Diabetic patients had a significantly lower vitamin D level compared to non diabetic sibling. Vitamin D was found to be deficient in 70% of the diabetic patients and in 40% of their siblings. Vitamin D deficient patients had significantly higher frequency of previous rickets, presence of DKA as initial presentation of diabetes, increased insulin requirements, MBG, HbA1c and decreased C peptide level compared to those with normal vitamin D. Vitamin D supplementation was associated with a significant increase in fasting C-peptide with a concurrent decrease in MBG and HbA1c. Vitamin D level was inversely correlated with insulin dose, (r = -0.41, P = 0.001), MBG (r = -0.45, P = 0.001), HbA1c levels (r = -0.44, P = 0.001), and positively correlated with C peptide level (r = -041, P = 0.002). In Sibling, Vitamin D was only negatively correlated with MBG.
Conclusion: A great proportion of patients with T1DM and their siblings were found to have low vitamin D. Decreased insulin requirement together with improvement of metabolic control and pancreatic function with vitamin D supplementation implicates the importance of adequate vitamin D in optimization of metabolic control in patients with T1DM.

P-191-294

Behavioural problems and metabolic control in children and adolescents with diabetes in CDIC Bangladesh

B. Zabeen[1], F. Ahmed[1], B. Benarjee[1], S. Tayyeb[1], F. Naz[1], F. Mohsin[2], N. Nahar[2] & K. Azad[1]
[1]*BIRDEM-2, BADAS, CDIC, Dhaka, Bangladesh;* [2]*BIRDEM-2, Paediatrics, Dhaka, Bangladesh*

Objectives: Psychosocial factors play an integral part in the management of diabetes in children and adolescents potentially affecting the glycemic control. Adolescents with diabetes are considered to be at increased risk of having behavioural problems as well as poor glycaemic control the aim was to evaluate the behavioural problems in children and adolescents with diabetes and determine the relationship with their metabolic control.
Methods: Two hundred and six children and adolescents with diabetes aged 4- 16 years who followed in CDIC Diabetes clinic at BIRDEM were assessed by the Strength and Difficulties Questionnaire (SDQ- parents). Demographic and clinical data were also collected including age at disease onset and during registration, gender and socioeconomic status.
Results: Mean age at disease onset was 9.9 ± 3 .8 years and at registration was 11.7 ± 3.3 years, mean duration of diabetes was 23.24 ± 31.7 months, 59% were girls. Girls have more emotional problems than boys (53 vs 31 P < 0.022) and less conduct problems (27 vs 19 P < 0.009). SDQ index revealed 15% patients with borderline scores and 23% with abnormal high scores. Subscales of SDQ: emotional problems 41%, conduct problems 22.3%, Hyperactivity 10.2%, peer problem 29.6% and prosocial behaviour 4.4%. Those who are in adolescent age group had emotional problems more than other age group (P < 0.003). Children with emotional problems have higher HbA1c at follow up (9.8 vs 9.5 P < 0.003). Adolescents also had conduct problems more than other age group (P < 0.056).
Conclusion: More than 37% of these children and adolescents with diabetes had borderline or abnormal high and clinically significant emotional problems. Emotional problems in Children and adolescents with diabetes was associated with higher HbA1c.

P-180-295

Application and evaluation of Arabic diabetes educational program on diabetic patients and their families

I. Emara[1]
[1]*NIDE, Cairo, Egypt*

Education for diabetic patients & their families about how to live safe with diabetes and how to enjoy your life with diabetes is an essential item during management of diabetes.
Aim: The aim of this work was to apply and evaluate the Arabic educational program that had been built specifically for the Arabic diabetic patients & their families. The program was explained for the nurse supervisors and the junior doctors to prepare them to be as diabetes educators. The program consisted of three sessions. First session contain explains to definition of diabetes, classification of diabetes, diabetes in children and adolescents, how to deal with acute complications of diabetes, (hypoglycemia & hyperglycemia and diabetic ketoacidosis. The second session contains summary of first session in addition to management of diabetes including: change of life style, nutritional therapy, oral and insulin therapy and how to deal with exercise, school days and fasting with diabetes. The third session contains summary of the previous tow sessions in addition to chronic complications of diabetes and how to live without diabetic complications. After application of every session there was an open discussion with patients & their families. The program was applied on 300 diabetic patients with pretest questionnaire and posttest questionnaire. The test result was 40% while the posttest result was 90%. The program was applied twice through 3 months on 100 patients and the posttest for them was 98%.
Results: There was a significant difference between glycated HbA1c levels before (HaA1c= 9.21 + 3.65%) and after application of the program (HbA1c = 7.43 + 2.65%).
Conclusion: It was recommended to apply this program on all diabetic patients and their families and it was advisable to repeat the application of the program periodically. The program was given in 2 forms as a C.D. and DVD forms and was given to patients. It is going to be given as a handbook to be a reference with the patients.

P-133-296

Impact of emotional competences and family functioning on glycemic control of young type 1 diabetic people

M. Housiaux[1], O. Luminet[1,2], N. Van Broeck[3], H. Dorchy[4]
[1]*Catholic University of Louvain (UCL), Institute of Research in Psychological Sciences (IPSY), Louvain-la-Neuve, Belgium,* [2]*Belgian National Funds for Scientific Research (FRS-FNRS), Bruxelles, Belgium,* [3]*Katholieke Universiteit Leuven (KUL), Departement of Clinical Psychology, Leuven, Belgium,* [4]*Free University of Brussels (ULB), Pediatric Diabetology Clinic, Children Hospital Queen Fabiola (HUDERF), Bruxelles, Belgium*

Objectives: We investigated the roles of psychological and social variables, at the side of sociodemographic and medical variables, to better understand glycemic control of young type 1 diabetic people (T1D).
Methods: From 2007 to 2011, 216 young T1D were recruited in the pediatric diabetology clinic of HUDERF (Belgium). The patients had between 8 and 18 years (48% of teenagers of >12 years), 45% of female sex, 66% of Belgian citizenship. The collected data concern: glycemic control (HbA1c; severe hypoglycemia (comas); severe hyperglycemia (hospitalization)); Emotional Competences (EC); Family

Functioning (FF); sociodemographic and medical information. For statistics, we used the Statistical Package for Social Sciences program (SPSS 18: Correlation Analyses and comparing means (CA); Hierarchical Regression Analyses (HRA); Moderation Analysis (MA)).

Results: CA show that some EC (verbal and non verbal expression; identification and differentiation; utilization; empathy for others) are related to a better glycemic control. HRA confirm that non verbal expression of emotions is a significant predictor of HbA1C, and that utilization of emotions is a significant predictor of severe hypoglycemia. MA show that: difficulties to describe feelings are even more harmful for glycemic control if the patient does not live with his 2 biological parents; awareness of its own emotions is even better for glycemic control in the patients of foreign citizenship. CA show that certain aspects of the FF (family rules and parental authority; heat and proximity between family members) are related to better glycemic control. HRA confirm that the family rules are a significant predictor of HbA1C.

Conclusions: This research shows the impact of psychological (EC) and social variables (FF) on glycemic control. It allows identifying protection and vulnerability factors for glycemic control of young T1D and gives tracks for a therapeutic work of accompaniment (individual or family).

Poster Tour 6 - Diabetes Care & Education & Psychosocial Issues

P-440-253

Evolution of a diabetes self-management educational process: an Egyptian experience

N. Salah[1], I. Ghaly[1], M. Hafez[1], M.M. Hassan[1] & S. Abuleil[1]
[1]*Cairo University, The Diabetes Endocrine and Metabolism Pediatric Unit, Pediatric Department, Cairo, Egypt*

Objective: To describe the evolution of a diabetes educational process at a large Egyptian referral center, The Diabetes Endocrine and Metabolism Pediatric Unit (DEMPU) at Cairo University's Children hospital.
Methods: Comprehensive description of development and improvement phases of a structured education program adopted in DEMPU, which started in early 90's and developed continuously till 2012. Description will include tools, process and results of assessment of children's and families' needs, methods of personnel recruitment and training, methods and results of multistage evaluation of the education process and its impact on glycemic control, compliance, frequency of life-threatening acute complications, and quality of life.
Results: The diabetes follow up clinic in DEMPU comprises 6000 infants, children and adolescents with type 1 diabetes. Evolution of the education process over 20 years with adaptation of methods, tools and content according to the needs, and with continuous personnel training significantly improved outcome regarding life-threatening complications. Limitations are still met regarding other outcomes: glycemic control, compliance and quality of life.
Conclusion: Continuous evaluation of the impact of the education process and its adaptation according to needs, and addressing challenges and limitations differs according to area, culure and beliefs of the cases and their families.

P-458-254

Adolescent girls with type1 diabetes and overweight: a specific educational intervention

A.M. Bertrand[1], A. Lasserre Moutet[2], A. Briquez[1], A. Dahoui[1], L. Vincent[1], S. Schwendenmann[1], C. Vaillier[1], B. Mignot[1], M. Francois[1] & A. Golay[2]
[1]*CHU Saint Jacques, Pédiatrie, Besancon, France;* [2]*Service d'Enseignement Thérapeutique pour Maladies Chroniques, Hôpitaux Universitaires, Genève, Switzerland*

Background: Adolescent girls with type1 diabetes (DIDT1) are exposed to an excessive weight gain during puberty, a risk of overweight or obesity, with frequent eating disorders, strategic insulin misuse and poor glycaemic control. In our file, 25% of teenagers girls are overweight (9% obese), the regional prevalence being 14.6-18.6%. A qualitative research explored their experience and needs, leading to propose an educational program.
Hypothesis: A more flexible nutrition learning (with flexible insulin therapy), if combined with body, emotional and relational approach, may enhance their Self Efficacy to manage their health problems.
Methodology: 4 thematic groups sessions (4 for adolescents, 1double with parents) were realized:
''1: listening to the body;
2: towards a suitable nutrition;
3: emotions' expression;
4: family help and autonomy''.
A pilot set was started with 5 girls (mean age: 15.7 years; Z score BMI: 2.2 ± 0.5; mean HbA1C: 8.1 + 0.6%).
Results: Their highest satisfaction score was for:''meeting the care team -differently-, the peers and the parents''. Significant points from their auto evaluation are: a high perceived utility rate for weight management: 4.2 on a scale 0-5; a particular interest for relaxation and eating perceptions' work, emotional management and family support; a strong motivation level with involvement in the process. Self Efficacy Perception increased from 5 to 8 on a scale 0 -10. Z Score BMI decreased or stabilized for 3/5 and increased for 2 /5, with a stable metabolic control. Simultaneously, the care team implements new care practices.
Conclusion: This first group experimentation with over weighted DIDT1 adolescent girls points out the potential benefit of a multidimensional approach, combining body perception and psychosocial skills' training. The next step will be to move toward a preventive approach, at the diagnosis of diabetes, especially at puberty onset.

P-113-255

How to ease the stays of children with type-1 diabetes at their grandparents? Analysis of the educational needs of the grandparents

C. Morin[1], C. Le Tallec[1], S. Malivoir[2] & R. Gagnayre[2]
[1]*CHU Hopital des Enfants, Diabétologie Pédiatrique, Toulouse, France;* [2]*Université Paris 13, Laboratoire de Pédagogie de la Santé EA 3412, Bobigny, France*

Introduction: The pediatric occurrence of type-1 diabetes is rising. Families being followed at the CHU of Toulouse show that, with the exception of the parents, few people can take care of a child with diabetes. It's difficult for the parents to entrust their child to somebody else's care (anxiety, trust issue, doubts on the abilities,…) even to grandparents. Diabetes prevents the children from being welcome in their own family.
Goals: Identify the educational needs of families with children with diabetes to favor stays with the GP: define the place of the GPs in the family and evaluate the factors influencing relationships between members, define the changes incurring from the diabetic child during the stay with the GP; collect the resources and difficulties of the parents and GP during the stay of a child with diabetes at his GPs.
Method: Analysis of the educational needs in 3 steps by an exploratory quantitative investigation from 120 families of children with diabetes in Midi-Pyrenees. Confirming of the preliminaries results from a collection of opinions during the meeting with 78 parents-GP on the theme « leaving my child in someone else's care », then identify needs priorities by performing focus groups with GP (one child Under 6 year-old and one child over 6 year-old) and parents (in child under 6, one child between the ages of 6 and 12, one child over 12 year-old).
Results: Changes in the stays and difficulties linked to the inter-families relations described during the «forum», shining light on the fears, anxiety and apprehension of the GP and parents during the focus groups, and confirmation of the technical difficulties linked to the feeding and treatment.
Conclusion: Confirmation of the need to implement a specific caring of the family circle.

Keywords: Child/type-1 diabetes/grandparents/educational needs/stay.
Shortcuts: GP: grand parents /IDD insulino-dependent diabetes

P-489-256

Teaching self-care behaviour to adolescents in Saudi Arabia with type 1 diabetes

S. Ammer[1]
[1]*Cardiff University, SONMS, Cardiff, UK*

The ultimate aims of this research are to implement a structured diabetes education programme (SDEP) specifically designed for the adolescent population, and to determine any potential effects on their knowledge, self-care and glycaemic control.NICE (2004) recommended a SDEP. There is an evidence gap related to evaluation of the effectiveness of SDEP. In Saudi Arabia, a SDEP has not been implemented. Poor glycaemic control can lead to serious complications. Consequently, improving diabetes care for adolescents requires educational programmes to enhance their responsibility for their own care. Therefore, this research focuses on the implementation of a SDEP for adolescents with T1D in Saudi Arabia and the potential effects on their knowledge and metabolic control.
Study aims and objectives: To determine the potential effects of a SDEP on knowledge, behaviour and metabolic control of adolescents withT1D in Saudi Arabia.
The objectives for this study are therefore: Assess self-care behaviour, diabetes knowledge and HbA1c of adolescents with T1D in SA before, immediately after and 6-months post-intervention.
Implement the SDEP.
Explore the experiences of adolescents with T1D of receiving the SDEP.
Methodology/ design: A mixed methods
Sample: Adolescents with T1D (n = 40)
Data collection: Questionnaire:
Focus group (n: 8-10)
face to face interview (sub group n = 6)
HbA1c (pre and post intervention)
Data analysis: SPSS (quantitative data analysis). The verbatim transcripts (qualitative content analysis)
Expected outcomes: This study will assess the impact of SDEP provision on the self-care practices, diabetes knowledge and glycaemic control of a group of adolescents with T1D in SA, and provide an understanding of the experience of receiving the SDEP from their perspective. It is anticipated that the findings from this research will inform future policy on diabetes education for young people in SA.

P-237-257

The development of a new paediatric endocrinology subspeciality training program in South Africa

F.P.-R. De Villiers[1]
[1]*MEDUNSA Campus, University of Limpopo, Paediatrics and Child Health, Pretoria, South Africa*

Background: Subspeciality training in South Africa began to be formalised in the 1980s. At that time there were no officially accredited training programs. Accordingly, doctors with accreditation from other countries, or with extensive experience in the subspeciality, were recognised as subspecialists, based on peer review.
Objective: The objective was to document the development of a new paediatric endocrinology program in a previously disadvantaged medical school.
Method: In preparation for the HPCSA inspection (Health Professions Council of South Africa) scheduled for early 2012, a new paediatric endocrinology program was developed at our university.
Results: While the HPCSA accredits subspecialists in medicine, The Colleges of Medicine (CMSA), provide the syllabus and examinations for subspeciality training. The Department of Paediatrics and Child Health of the MEDUNSA campus of the University of Limpopo planned a new training program for a Paediatric Endocrinology Fellow, and applied to the HPCSA for accreditation. The programme outline is as follows: the Fellow will be available for endocrine and metabolic consultations during the week. The outpatient clinic dealing with sufficient patients for training will be handled by the Fellow under supervision. A metabolic ward round will be re-established. During this round patients in the wards with metabolic problems will be identified, investigated and managed by the Endocrinology Fellow. A weekly postgraduate discussion will be jointly held with the Department of Chemical Pathology. A Paediatric Endocrinology journal club will be held every second week, alternating with endocrinology case discussions between the endocrinologists and the chemical pathologists.
Conclusion: The HPCSA panel indicated that the application was considered successful. Although to date we have not had written confirmation, we are continuing our planning and will be ready to train a Fellow as soon as written confirmation is received.

P-401-258

CDIC - a holistic approach of paediatric diabetes care in Bangladesh

B. Zabeen[1], B. Benarjee[1], S. Tayyeb[1], F. Naz[1], M. Rahman[1], N. Absar[1], F. Mohsin[2], N. Nahar[2] & K. Azad[1]
[1]*BIRDEM2 BADAS, CDIC, Dhaka, Bangladesh;* [2]*BIRDEM2, Paediatrics, Dhaka, Bangladesh*

Objectives: Paediatric Diabetes management is unavailable in developing-country like Bangladesh except at BIRDEM Hospital in Dhaka. Children with diabetes are managed by the adult diabetes clinic or in the general medical outpatient clinics. The aim was to introduce comprehensive management for children with diabetes.
Methods: CDIC(Changing Diabetes in children) a dedicated comprehensive service for diabetes care for children and adolescents was established with one central and two satellite paediatric diabetes clinics in joint collaboration with Diabetic Association of Bangladesh and Novo Nordisk supported by WDF.
Results: The training of Health care professionals was organized and a common management plan is followed in all the three centers. Free comprehensive care including medical consultations, education, insulin with syringes, HbA1c with other investigations, glucometer with strips are provided to all children. Initially we started with 100 children which has increased to 1250 within 2 years. Children are more motivated and are coming for follow up visits regularly from almost all over Bangladesh. For irregular patients we organize home visit by educators to encourage them to better manage their diabetes. A separate diabetes education session for children and their families has been started. Counselling of children and parents has also been started to motivate them in coping with diabetes. As because more than 50% patients are coming from different districts and cannot afford to come to the center, transportation cost is provided to them to ensure regular follow up. To make the programme sustainable substantial plans for the future have been made for these children and adolescents such as Educational grant, Rehabilitation programme.
Conclusion: CDIC may not only be a role model for special care for children with diabetes it can also be replicated further to

enhance and spread the design of healthcare management of diabetes in children.

P-418-259

Family centered diabetes care - an innovative program from children's hospital: London Health Sciences Centre

J. Kaipainen[1], R. Duncan[1]
[1]*Children's Hospital LHSC, Diabetes, London, Canada*

Objectives: Family Day is an innovative program developed by the diabetes team to support patients and families in accessing the information and motivation necessary to manage diabetes and achieve ongoing good health and avoidance of complications.
Methods: The program addresses the lived experience of diabetes in a fun and relaxed setting away from the formality of the hospital. Held on a Saturday with all 683 patients, siblings, parents and caregivers invited, parking is free, and lunch provided. In addition to key note speakers are age defined breakout sessions with siblings in attendance. Preschoolers enjoyed a scavenger hunt and designed their own shirts. School age kids created therapeutic masks and participated in cookie making. Teens shared ''Teen Talk'' and met a police officer with diabetes. Caregivers/parents discussed their challenges and successes in a discussion group. The keynote addresses were provided by a diabetes hero, including a man who climbed Mt. Everest, an airline pilot, and an exercise physiologist. The event is evaluated by all participants. A1c levels and clinic attendance are also tracked.
Results: 33 patients with 68 family members or 5% of the patient population attended. Average A1c remains unchanged from pre intervention to post, as does clinic attendance.
Conclusion: Family Day is well received by attendees. ''My daughter needs to hear these messages of inspiration and hope''. Future considerations include separate sibling sessions, involvement of female heroes and increasing attendance.

Table: Feedback.

Parental Evaluations	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I will use some of the tips presented	72%	14%	13%	1%	
I learned something new	74%	19%	7%		
Teen Evaluations	Strongly Agree	Agree	Neutral	Disagree	
I will use some of the tips presented	30%	42%	24%	2%	
I learned something new	38%	38%	24%		
Child Evaluations	I really liked it	It was OK	I didn't liked it		
	59%	38%	3%		

P-405-260

Assessment of macro and micronutrients value in diet children with diabetes type 1

M. Gąbka[1]
[1]*Institute of Mother and Child, Outpatient Diabetes Clinic, Warszawa, Poland*

Objectives: The purpose of the study was to evaluate the quality and quantity of nutrition in children with diabetes type 1.
Methods: The patients involved in the study were selected randomly during regular visits. The formula of 3- day nutrition recall required from patients was explained on the earlier visit. The calculations took into account technological losses. We calculated nutrition value by the computer program Dietetyk 2. The individual consumption of micronutrients estimation was regarded to RDA (Recommended Dietary Allowance) or AI (Adequate Intake) norm level.
Results: Of 37 patients aged 5 - 17 years old with median HbA1c 7.6 mg% (5.8 – 11.4 mg%) treated with insulin pomp and trained in carb and fat - protein counting, median SDS BMI 0,5 (-3 to 2.8). The average energy value was 1666 kcal (6963.88 kJ) including protein 15.5%/15% RDA, total fat 35.9%/30 - 35% RDA, saturated fatty acids 14.4%/<10% RDA and carbohydrates 48.6%/ 45 - 60% RDA. The greatest deficiency in micronutrients we observed in potassium (58% recommended intake - RI), calcium (50% RI), magnesium (82% RI), iron (68% RI), vitamin D (39% RI) and folic acid (62% RI). This indicates to insufficient intake of vegetables, dairy products, nuts and seeds, wholegrain products, lean red meat and oily fishes. None of analyzed diet plan was compatible with rules of well - balanced diet recommended by National Food and Nutrition Institute.
Conclusions: Despite good metabolic control and well units counting we observed inappropriate proportions of fatty acids and micronutrients deficiency. There is a strong need to educate and verify patients and parents how to elaborate well - balanced diet adjusted for individual needs.

P-309-261

An examination of outdoor experiential diabetes education in the development of character and community in young adults with type 1 diabetes

J. Hanson[1,2]
[1]*Connected in Motion, Experiential Diabetes Education, Sunderland, Canada;* [2]*Brock University, Faculty of Education, St. Catharines, Canada*

Aim: Connected in Motion (CIM), an organization serving young adults with Type 1 diabetes (T1D), hosted outdoor and experiential diabetes education programs in January of 2009 and 2010. The weekends provided non-clinical alternative diabetes education to an underserved population of young adults with T1D within Canada. The aim of this study was to gain an understanding of the process of character development through outdoor experience and its effects on self-management among a group of young adults living with T1D as well as to evaluate how groups such as CIM may provide these experiences.
Method: Six young adults with T1D between 18 and 30 years of age participated in this phenomenological research study, which was framed by Bandura's (1979) Social Cognitive Theory. Each young adult completed a semi-structured interview and an artifact-elicitation interview. All participants were female and had been involved in CIM's Winter Slipstream event in 2009 or 2010. Data analysis was inductive in nature.
Results: 5 themes emerged through this study:
(a) The Evolution of T1D Self-Management Practices;
(b) Creating a Supportive Community;
(c) Redefining What is Normal;
(d) The Recipe for Success as a Person with T1D; and
(e) The Promotion of Personal Growth.
The development of community and the experiential learning cycle allowed participants to gain confidence in new skills and abilities, specifically pertaining to diabetes self-management. Overall, outdoor experiences significantly impacted character building and self-management behaviour.
Discussion: Although character development plays a role in T1D management, of greater importance is the notion that a sense of community, fostered through outdoor pursuits, allows for better

self-management practices. CIM programs provide opportunity for self-management practice, peer-to-peer networking and experiential T1D education and serve as a worthy exemplar for experiential, non-clinical diabetes education programs for young adults.

P-260-262

A randomized controlled study on the effect of a group therapy for parents of youths with type 1 diabetes on quality of life

L. Nardi[1], S. Zucchini[1], E. Petracci[2], G. Cavrini[2], G. Maltoni[1], M. Scipione[1] & F. D'Alberton[1]

[1]*S. Orsola Malpighi Hospital, University of Bologna, Department of Pediatrics, Bologna, Italy;* [2]*University of Bologna, Department of Statistics, Bologna, Italy*

Background and aim: Group interventions for youths with diabetes can improve both Health-related Quality of Life (HRQoL) and short-term glycaemic control. This study investigates how a group therapy, carried out on parents of diabetic adolescents and children, may influence quality of life and indirectly metabolic control of youths with type 1 diabetes (T1DM).

Methods: A total of 147 patients aged 3-19 were asked to participate in a randomized controlled trial. 69 families agreed to participate and were randomized into two groups: those undergoing the psychotherapeutic intervention (n = 20) and the control group (n = 49). Every 3 weeks, 10 psychodynamic group meetings of around 15 parents were held by a trained psychotherapist. Questionnaires and HbA1c were evaluated on four occasions (before the therapy, after the therapy, 6 months after the therapy and 1 year after the therapy). HRQoL was evaluated by administering the EQ-5D-PROXY questionnaire to youths' parents. To analyze the data a multilevel model for repeated measures was used.

Results: Patient's mean age was 13.2 years old (range 3.4-19.0) and mean disease duration was 6.3 years (range 0.5-15.7). Initial HbA1c was 7.9 (range 5.8–13). Due to the high rate of dropouts, data was analyzed by means of an intention-to-treat approach. The results from the multilevel analysis showed a positive association between the group intervention therapy and EQ-5D-VAS proxy as reported by parents, after patients' characteristics and clinical and psychological information had been taken into account. Although HbA1c values remained unchanged during the study, a significant negative correlation between HRQoL and HbA1c was observed.

Conclusions: Group psychological intervention for parents of children and adolescents affected by T1DM seems to improve quality of life of youths with diabetes. The high presence of dropouts suggests that clinical randomized interventions may not be the best approach for psychological interventions.

P-239-263

The effect of blood glucose change on cognitive skills in children with T1D

R. Hannonen[1], J. Komulainen[2], R. Riikonen[3] & T. Ahonen[4]

[1]*Carea - Kymenlaakso Social and Health Services, Department of Child Neurology, Kotka, Finland;* [2]*The Finnish Medical Society Duodecim, Helsinki, Finland;* [3]*Kuopio University Hospital, Kuopio, Finland;* [4]*University of Jyväskylä, Department of Psychology, Jyväskylä, Finland*

Objectives: Children with type 1 diabetes (T1D) experience fluctuation in blood glucose (BG). Whereas hypo- and hyperglycemia can cause acute deterioration in cognitive processes, BG change could also affect performance. As a part of the study aimed at assessing cognitive functions in children diagnosed with T1D before 5 years of age, we also analyzed acute effects of BG change on cognitive and academic skills.

Methods: Children with T1D (n = 60) were assessed with the tests of naming speed, reading speed and accuracy, spelling accuracy and phonological processing in the 3rd grade (at the age of 9 to 10 years). Their BG was measured in the beginning (BG1) and in the end (BG2) of the cognitive assessment. The assessment was performed only if BG1 was 4-18 mmol/l in order to avoid acute effects of hypo- and hyperglycemia. BG change (??|BG2-BG1|) was used as the predictor and the speed (naming and reading speed) and accuracy (phonological processing, reading and spelling accuracy) measures as dependent variables in multivariate General Linear Models.

Results: BG1 or BG2 was not associated with speed and accuracy measures. Bigger BG change was associated with slower naming (P = 0.004) and reading speed (P = 0.011). Both positive and negative change was associated with slower performance. Accuracy of the performance was not affected (P = 0.772). The results did not change, when BG1 was controlled for.

Conclusions: Blood glucose fluctuation might be associated with the speed of cognitive performance, but the mechanism behind this association remains to be clarified in further studies. Acute blood glucose changes could be one of the factors associated with subtle cognitive problems in children with T1D.

P-221-264

Quality of life in children with type1 diabetes and their family and relationship to some psychosocial factors

A. Eladl[1,2], H. Atwa[3] & O. Eladl[4]

[1]*Arabian Gulf University, Manama, Bahrain;* [2]*Zagazeg University, Zagazeg, Egypt;* [3]*Faculty of Medicine, Suez Canal University, Ismailia, Egypt;* [4]*Misr International University, Ismailia, Egypt*

Background: Treatment of type1 diabetes often disrupts a child's usual activities, requires disease -focused behaviors from child and family.

Aim: To assess quality of life in children with T1D and their family.

Subjects and methods: Eighty children with type1 diabetes and their family were included. Quality of life was assessed by PedsQl. Diabetes care profile an instrument that assesses psychosocial factors related to diabetes was used.

Results: The child with T1D perception of QOL was higher than parent perception. The mean total score of PedsQL was (69.5 ± 10.3 and 67.2 ± 8.6) respectively. The child with T1D QOL was lower than their sibling (69.5 ± 10.3 and 73 ± 2.5). Parent QOL was lowest among family (66.5 ± 3.7). Good metabolic control was associated with better QOL. Diabetic children with high QOL had higher mother education, better diet adherence, understanding management practice and lower self monitoring of blood glucose barriers. Higher mother education and lower hypoglycemic or DKA attacks were good predictor of high QOL in Sibling of diabetic children.

Conclusion: Diabetes disrupts QOL of children with T1D and their family.

Poster Tour 7 - Diabetes Care & Education & Psychosocial Issues

P-482-229

Growth retardation and delayed puberty in children with diabetes in Guinea

N.M. Balde[1], J.S. Bangoura[1], M. Kouyate[2], S. Bah[3], D. Kasse[4] & M.P. Diallo[4]

[1]*Donka Conakry Teaching Hospital, Endocrinology and Diabetes, Conakry, Guinea;* [2]*Donka Conakry Teaching Hospital, Pediatric Diabetes Unit, Conakry, Guinea;* [3]*Donka Conakry Teaching Hospital, Conakry, Guinea;* [4]*Donka Conakry Teaching Hospital, Pediatric, Conakry, Guinea*

Introduction: The number of diagnosed diabetes among children increases in Guinea. Assessment of statural growth and puberty is one a part of diabetes management in children's routine consultation.
Objective: To evaluate the frequency of statural growth and puberty of children with diabetes followed in Guinea.
Method: Between June 2009 and avril 2012 we recorded in Diabetes registry 189 subjets aged below 18 years. These subjects was followed in the Pediatric diabetology unit (n = 64), Department of Endocrinology (n = 77), Diabetes Unit in Labé (n = 27) and Diabetes Unit in Kankan (n = 21). The Measured height was compared to the target size according to WHO curves, and growth retardation defined by a size of <-2.0 SD. Puberty scored on Tanner stage was compared to expected for chronological age. We report here the description of children followed In Conakry (in the Department of Endocrinology and Diabetology Unit of Pediatric).
Results: The mean age of children at discovery of diabetes was 14.79 ± 3.53 years [5 - 18]. The sex ratio (M/F) was 0.79. The duration of the evolution of the condition was 2.16 ± 2.65 years [1-10]. The mean of glycated hemoglobin was 7.97 ± 2.59% [4.5-14.0] (n = 35). The mean weight of the children was 52.25 ± 14.73 Kg [19.8-118] for BMI of 20.61 ± 4.40 kg/m^2. 24.1% of subjects were underweight and 6.9% were overweight. Measured height was 1.58 ± 0.13 [1.17-1.76] m for age at examination of 16.24 ± 3.88 [5-18]. Delay of growth was present in 33.33% of cases (26.47% in the girls and 29.62% in the boys). Delayed puberty was present in 9.83% of cases (11.76% of the girls and 7.40% of the boys).
Conclusion: Growth retardation and delayed puberty are frequent in children with diabetes in Guinea. Their assessment should be systematic in routine consultation for early diagnosis and treatment.
Keywords: Statural growth, puberty, children, diabetes.

P-442-230

Would you like to enter your diary with me? A new web-based system to encourage diabetic children and adolescents to self-control

B. Sezgun[1], I. Arslanoglu[2] & A. Baspinar[1]

[1]*Abasus, Zonguldak, Turkey;* [2]*Duzce University School of Medicine, Pediatric Endocrinology, Duzce, Turkey*

Objectives: Type 1 diabetic children and adolescents are facing a huge stress when solving daily metabolic problems or when fulfilling the responsibilities attributed by the environment, by the disease itself or by their conscience, such as glucose monitoring, which sometimes let them to ignore everything.This is a web based program to overcome these barriers.
Methods: The system is mainly inspired from social network sites. It is possible to create several groups guided by responsable health professionals. The system provides user-friendly smart modules to enter sugar, insulin values, to create graphs, to calculate carbohydrates, to calculate insulin doses using formulae and to share papers, photos, invitations, plays etc.
Results: Not applicable, since we did not yet test its validity by clinical trials.
Conclusions: This abstract is just to share a new method via poster presentation and suggest this non-profit effort to everybody interested.

P-493-231

Issues in the management of diabetes in youth of three Caribbean countries and their caregivers' perspectives

S. McFarlane[1,2], O. Bernard[1], A. Castillo[1] & C. Mathurin[1]

[1]*Diabetes Association of Jamaica, Kingston, Jamaica;* [2]*University of the West Indies, Epidemiology Research Unit, Kingston, Jamaica*

Objectives: To evaluate the caregiver perspectives of children and youth with diabetes to ascertain the potential barriers to care.
Methods: The management of Diabetes in youth (MODiYouth) is a WDF funded project that focuses on the varying issues that affect the optimal management youth aged 0-24 in Jamaica, Belize and St Lucia. A focus group discussion using guided themes was conducted to assess the impact of diagnosis and care on the caregivers of youth with diabetes.
Results: The caregivers all reported that they had a first relative with diabetes and so the condition was not new to them. The fact however that their child was diagnosed with diabetes came as a shock a diabetes is ''an old man's disease''. On first diagnosis most parents cried and went into denial for a while. The family structure had to be realigned to deal with the meal changes and work related disruptions and increased expenditures for the household. The children with diabetes reported feeling isolated, ''different'' and hopeless in that they did not feel they would live to be a normal adult. There was also the perception of the caregivers that their child had to be treated differently and this in turn impacted the behaviour of the youth who felt they could not talk to their caregiver about their condition. In a developing country the increased burden of youth diabetes can result in increased pressure on a mostly matriarchal household. The reported increased support from other family members, friends and church members if consistent, can help to ease the burden and aid in the holistic management of the condition.
Conclusions: Stress was the major behaviour reported by the parents of youth with diabetes whilst the reported feeling hopeless and. This was due to a major change in lifestyle for the family as a whole. A support group structure that emphasizes the family as a unit is a key component to improved management of the youth in the Caribbean.

P-469-232

Ambulatory management of children with newly diagnosed type 1 diabetes

E. Stringer[1], S. Kannan[2] & S. Greenhalgh[3]
[1]*University of Manchester Medical School, Manchester, United Kingdom;* [2]*Royal Manchester Childrens Hospital, Manchester, United Kingdom;* [3]*Salford Royal NHS Foundation Trust, Salford, United Kingdom*

Objectives: To evaluate the effectiveness of the ambulatory management program for children with newly diagnosed Type 1 diabetes.
Methods: Children with newly diagnosed Type 1 diabetes traditionally have been admitted in hospital for a few days for diabetes education and management. A new ambulatory children's unit opened in 2009 in Hope Hospital, Salford where children can be admitted and managed for only less than 24 hours. So an ambulatory diabetes management program was developed. But children in DKA and with other psychosocial issues were transferred to the nearby Children's hospital. The program was reviewed in July 2011. 22 children were diagnosed with Type 1 diabetes during July 2009 - 2011. The following patient information was collected: gender, ethnicity, age at diagnosis, DKA status, insulin regimens and HbA1c, length of stay, readmission episodes, follow-up arrangements and contact with the paediatric diabetic specialist nurse (PDSN).
Results: Of the 22 children, 9 were managed in the ambulatory unit and 13 as inpatients in a different hospital (7 were in DKA). Average age: 9 years (range 1–15 years); Males = 15, Females = 7; Readmission episodes = 7 (2 in ambulatory group but were not in DKA or severe hypoglycemia); Average length of stay: ambulatory grou P = 17.6 hours (range 3–23 hours) inpatient grou P = 4 days (range 1–8 days). Average latest HbA1C: ambulatory 8.6% and inpatient 7.6%. Variation in HbA1C can be explained by small sample size, different insulin regimen and variable duration of diabetes. All patients were seen in the outpatient clinic within 5 weeks of diagnosis. The amount of contact with the paediatric diabetic service was similar between patients apart from the ambulatory group who had home education with the PDSN and the dietician in the first week.
Conclusions: This review shows that ambulatory management of children with Type I diabetes can be safe and effective with reduced length of stay and less adverse events.

P-455-233

Impact of celiac disease and autoimmune thyroid disease treatment on quality of life in children and adolescents with type 1 diabetes

S. Pruhova[1], A. Rehulova[1], P. Dusatkova[1], S. Kolouskova[1], M. Snajderova[1], B. Obermannova[1], K. Stechova[1], O. Cinek[1], Z. Sumnik[1] & J. Lebl[1]
[1]*2nd Faculty of Medicine, Charles University in Prague, Department of Paediatrics, Prague, Czech Republic*

Objectives: Aim of our study was to determine the quality of life (QoL) in children and adolescents with type 1 diabetes (T1D). Additionally, influence of concomitant treated thyroiditis (AITD) or celiac disease (CD) was evaluated.
Methods: The study included pediatric patients at our diabetes centre who were treated with insulin for at least one year (median 6 years) and capable of filling out the Varni PedsQL (Pediatric Quality of Life) generic and diabetes-related questionnaires. Responses were collected from 224 patients (115 boys) aged 8-18 years as well as from their parents. Concomitant AITD treated with L-thyroxin was present in 41/224 (18.3%) patients, whereas 23/224 (10.2%) patients had biopsy-proven CD on the gluten-free diet; five of the patients had both concomitant diseases. Data were analyzed by regression analysis.
Results: Both generic and diabetes-related QoL was better apprehended by patients themselves, as compared to their parents ($P < 0.0001$ for both generic and diabetes-related questionnaires). Boys scored their QoL higher than girls ($P < 0.03$). Lower HbA1c was associated with better diabetes-related quality of life ($P < 0.008$). The treated CD did not associate with significantly lower QoL ($P = 0.12$), whereas pharmacologically treated AITD was related to lower assessment (i.e. worse QoL) in both the generic, and diabetes-related QoL in patients (lower score by 4.2 points, CI95% -7.8 to -0.61, $P = 0.02$). Statistically significant relations between quality of life and age of respondents, number of years since disease manifested, or way of treatment were not observed.
Conclusions: Apart from being associated with sex and diabetes control, the QoL seems to be also related to the pharmacologically treated AITD but rather surprisingly not to CD on a gluten-free diet. Further research should elucidate reasons for this discrepancy that could be related to the perception of the disease, or to the treatment.
Supported by institutional grant NT11402.

P-407-234

Parents' experiences of the education process when their child is newly diagnosed with type 1 diabetes

L. Jönsson[1], I. Hallström[2] & A. Lundqvist[1]
[1]*Lund University, Department of Health Sciences, Division of Nursing, Lund, Sweden;* [2]*Lund University, Department of Health Sciences, Division of Nursing/The Swedish Institute for Health Sciences, Lund, Sweden*

Objectives: Type 1 diabetes has increased substantially in recent years and it is now one of the most common long-term endocrine disorders in childhood. According to the national practice guidelines in Sweden the child and family are hospitalised for one to two weeks at diagnosis. The aim of this study was to describe parents' experiences of the educational process when their child is newly diagnosed with type 1 diabetes.
Methods: Open interviews with ten mothers and eight fathers of children newly diagnosed with type 1 diabetes were performed three to six months after the child had received the diagnosis. The interviews were analysed using a deductive content analysis and a theoretical framework.
Results: The parents had experienced a skilled and intense educational process with a cramming of knowledge according to a schedule at precisely the time that they were in a state of shock and grievance over the fact that their child had a chronic disease. The routines learned at the hospital were brought back home which made the parents' efforts at being good parents, managing the child's disease and continuing normal family life a difficult task.
Conclusions: In order to optimize the educational process for families with children newly diagnosed with type 1 diabetes it might be useful to elucidate each family's individual need of knowledge and skills. Good care is about keeping a balance through the education process when the care interferes in the family's values and influences every part of their lives.

P-171-236

Paediatrics and adolescents diabetes electronic careplan and data collection the electronic care plan has become a pivotal element of the Metro North Diabetes Service

A.I. Keid[1]
[1]*Queensland Health, Metro North Diabetes Service, Caboolture, Australia*

The concept of the Ecareplan was the idea of Dr Nicholas Woodfield. Its value recognised in winning ISPAD award for innovation 2011. Additional funding has allowed Project Officer Annette Keid, Dr Woolfield and the Service to further develop this care plan and by September it will have database capacity with linkage to current inhouse systems to allow collection of the front end information inputted by clinicians during clinics. To enable: Accurate data collection for reporting on KPI, immediate and improved transfer of clinical data to included stakeholders, the potential collection of data for reporting for activity based funding components of care, and audit data for multi-disciplinary teams-to breakdown occasions of service by discipline. Improve patient self management care by: Offering the patient a clinical management plan at the point of contact, Can be sent electronically to schools and GPs with consent, develops patient empowerment improving patient self management skills by providing patients and their families with a working tool to be used e.g. sick days, Reduces after hours calls to the diabetes team, Can be used as a checklist for screening, Increases the partnership approach with patients and clinicians and Improvement in self management skills means less ad hoc or out of hours demand. The multidisciplinary diabetes team across Metro North Health Service District, along with stakeholders across Queensland Health Hospital & Community and in collaboration with Medicare local, parents and teachers have been developing this tool over many years. The latest version of the electronic careplan has easily interchangeable fields which will permit further development as changes to diabetes management principles present or for use by other chronic diseases; interested parties include Epilepsy& Renal disease. In order to truly evaluate this product we have selected a second site where it can be introduced and audited separately from its present users.

P-183-237

Diabetes management among children in the T1D Exchange Clinic Registry: who is doing what?

L. Deeb[1], P. Cheng[2], K. Miller[2] & R.W. Beck[2]
[1]*Tallahassee Memorial Hospital Foundation, Tallahassee, USA;* [2]*Jaeb Center for Health Research, Tampa, USA*

Objectives: Daily management of type 1 diabetes (T1D) through insulin regimens varies greatly. To assess the benefit of one regimen over another on glycemic control, it is important to understand the different ways T1D is being managed. We used the T1D Exchange database from 59 US clinics to describe diabetes management in youth of varying ages and duration of T1D.

Methods: Insulin delivery and glucose monitoring approaches were assessed according to age among participants < 18 years old. Chi-square test was used to assess association between age and pump use.

Results: An insulin pump was being used by 47% of the 12 643 participants: 33% of those <6 years old, 47% of those 6 to <13 years old, and 50% of those 13 to <18 years old ($P < 0.001$). Across these clinical sites, the median (interquartile range) % of participants using an insulin pump was 45% (33% to 65%). Among injection users, almost all were using some combination of basal and bolus insulin dosing, with 43% using a pen, 40% using a vial and syringe, and 17% using a combination; NPH was part of the insulin regimen in 11%. Insulin treatment and glucose monitoring characteristics stratified by insulin delivery method are shown in the Table.

Conclusion: Pump use is more frequent in teenagers than younger children. Frequency of pump use across T1D Exchange Clinic Network sites varies considerably. Further research on which insulin regimens lead to better glycemic control is warranted. CGM use is remarkably infrequent at all ages.

	Pump			MDI		
	<6 years	6 to 13 years	13 to 18 years	<6 years	6 to 13 years	13 to 18 years
	N = 365	*N* = 2862	*N* = 2710	*N* = 746	*N* = 3200	*N* = 2760
TDI/kg, median	0.7	0.8	0.9	0.5	0.7	0.8
Bolus/Basal Ratio, median	1.7	1.5	1.5	1.8	1.3	1.1
# of Bolus per Day, median	6	6	5	3	3	4
CGM use	7%	5%	4%	<1%	<1%	<1%
SMBG per Day, median	8	7	5	6	6	4
Always Check BG before Bolus	85%	79%	50%	91%	88%	59%
Download HGM at least 1x/mo	27%	21%	15%	11%	8%	8%

P-320-238

Glycaemic control in children with diabetes mellitus in Vietnam

C.T. Bich Ngoc[1], V.C. Dung[1], K. Armstrong[2], B.P. Thao[1], N.N. Khanh[1], H. Nuala[3] & M. Craig[4]
[1]*National Hospital of Pediatrics, Department of Endocrinology, Metabolism & Genetics, Hanoi, Viet Nam;* [2]*Peter Gill Medical Centre, Sydney, Australia;* [3]*Caring and Living as Neighbors, Sydney, Australia;* [4]*The Children's Hospital at Westmead, Westmead, Australia*

Appropriate management of diabetes in Vietnam is challenged by limited resources affecting access and delivery of health care, education, adherence and affordability of treatment. The financial burden of chronic diseases such as diabetes upon families is a significant barrier to ideal care.

Objectives: To evaluate glycaemic control and diabetes care in children attending annual family support groups of Vietnam National Hospital of Pediatrics (NHP) in Hanoi.

Subjective and methods: Fifty patients with diabetes mellitus attending annual family support groups in 2010 and in 2011. HbA1c was measured using a DCA 2000 analyser (Bayer Australia Ltd., Pymble, NSW, Australia), non-diabetic range (4.0–6.0%). Random fingerprick blood glucose was measured using an Optium Xceed glucometer (Abbott DiabetesCare, Alameda, CA), non-diabetic range 4.1–5.9 mmol/l (74–106 mg/dl).

Results: Of the 50 patients paticipated, 29 female, 21 male, 46 cases with diabetes mellitus type 1; 2 cases with diabetes mellitus type 2 and 4 cases with neonatal diabetes. The median

age was 14.5 ± 7.8 years [interquartile range (IQR) 3.6 - 41 years] and the median duration of diabetes was 87.1 ± 81.7 months (Median 64 months, IQR 1 - 432 months). There was no difference of HbA1c levels between 2010 and 2011: the mean HbA1c levels were 9.2 ± 2.4% and 9.4 ± 2.7% in 2010 and in 2011, respectively. In there, the four patients with neonatal diabetes had a median HbA1c of 6.7 ± 1% (IQR 5.7-7.8%) and 6.75 ± 1.3% (IQR 5.4 - 8.2) in 2010 and in 2011, respectively. In conclusion, international glycaemic control targets for childhood diabetes (HbA1c < 7.5%) are not being achieved in Vietnam, and intensive diabetes management is rare. There is an urgent need to address barriers to achieving optimal control in this population.

P-349-239

The effect of standart and continuing education on metabolic control in the patients with type 1 diabetes mellitus

B. Haliloglu[1], A. Omar[1], Z. Atay[1], T. Guran[1], A. Bereket[1] & S. Turan[1]
[1]*Marmara University, Pediatric Endocrinology and Diabetology, Istanbul, Turkey*

The education of the patients with type 1 DM (T1DM) is the most important factor for good metabolic control and the prevention of complications.

Aim: To assess the effect of standard education and follow up on metabolic control of the patients with T1DM who were diagnosed and followed for at least 6 months at different centers and, then, applied to our center for follow up.

Method: The standard education was given to the patient who presented to our clinic after evaluation of their basic knowledge about diabetes. Primary education started at the day of presentation and completed in following 2-3 weeks in 1-2 courses per week. Secondary education continued during follow-up visits per 2 to 3 month. Primary outcome is HbA1c levels which were evaluated at presentation and 3 monthly bases. The patients who followed at our clinic at least 1 years were included in the study.

Results: Thirty-one patients (19 F) were included in final analysis. The age at diagnoses was 7.7 ± 3.7 years. The age at presentation to our clinic was 10.9 ± 3.1 years, thus, the mean diabetes age of the patients was 3.2 ± 2.9 years. Mean HbA1c level at presentation was 9.5 ± 2.1% and decreased to 8.3 ± 1.6% in the following visit, which was similar to the 3rd year mean HBA1c (8.5 ± 1.8%) of the patient who were followed in our clinic from the first diagnosis (p: 0.4). Mean HbA1c has been continued to decrease for the next 4 years, as %8.5 ± 1, % 8.4 ± 1.1, %7.6 ± 0.8, % 7.7 ± 1.1 for the 1st, 2nd, 3rd and 4th years, respectively. The %75 of patients presented were referred from the hospitals which do not have any pediatric endocrinologist. There was no significant differences in insulin doses (0.8 ± 0.3 vs 0.8 ± 0.3 U/kg/day), regimens and calories from presentation to the first 6 month of the follow-up.

Conclusion: The education and motivation of patients are the most important factors on metabolic control of patients with type 1 DM. Continuous education programs should be established to increase this effect.

P-373-240

What do kids know about their diabetes few years after the diagnosis?

A. Stankovic[1], J. Obrenovic[2], A. Ostojic[2], S. Sajic[2,3], L. Stojanovic[1] & V. Zdravkovic[2,4]
[1]*University Children Hospital, Belgrade, Serbia;* [2]*Medical School, University of Belgrade, Belgrade, Serbia;* [3]*University Children Hospital, Division of Endocrinology, Belgrade, Serbia;* [4]*University Children Hospital, Divison of Endocrinology, Belgrade, Serbia*

Introduction: Diabetes mellitus type 1 (DM1) is specific because the whole family has to be involved in its management. Since the insulin dose is influenced by nutrition and physical activity, education of the child is extremely important.

Aim: The aim of this study was to find out at what age children, who are seen in our clinic, become independent to manage their DM1.

Methods: We conducted a survey of 51 patients with DM1, aged from 5 to 19 years. Questions included in the survey were: the age of patients (pts), duration of the diabetes and informations about different diabetes skills - glucose measurement, giving the insulin injections, coping with hypoglycemia and carbohydrate counting. We divided patients into groups according to the age (younger and older than 10 years) and to the diabetes duration of less or more than 4 years.

Results: Analysis of survey showed that 80.4% of patients are able to give themselves insulin injections, 86.2% are able to measure blood glucose, 92.2% know how to manage hypoglycemia, 92.2% are physically active and 51% know to count carbohydrates. When we compared them according to diabetes duration, those diagnosed 4 years ago (26 pts) knew more about their diabetes management, than those who were diagnosed earlier (25 pts), although this was not statistically significant. More important differences, were found when we compared them according to the age. Those who were older than 10 years of age (39 pts) knew more about their diabetes, than those younger than 10 years of age (12 pts), which was statistically significant ($P < 0.05$). We also found out that majority of children are able to measure glucose and to give themselves insulin immediately after the diagnosis.

Conclusions: The independence of a child is more influenced by his age, than the disease duration. This survey shows us that we need to update the diabetes education every 2 years and to encourage the child to be more independent.

Poster Tour 8 - Diabetes Care & Education & Psychosocial Issues

P-461-241

Overcoming obstacles to diabetes management: exchange programme between adolescents with type 1 diabetes from Switzerland and Quebec

M. Castellsague[1], L.P. Grandguillaume[1], J. Romain[2], C. Huot[2], V. Schwitzgebel[3] & M. Caflisch[4]
[1]*Hôpitaux Universitaires de Genève, Direction de Soins, Genève, Switzerland;* [2]*Centre Hospitalier Universitaire Sainte-Justine, Montreal, Canada;* [3]*Hôpitaux Universitaires de Genève, Diabétologie Pédiatrique, Genève, Switzerland;* [4]*Hôpitaux Universitaires de Genève, Genève, Switzerland*

Introduction: Recognizing the importance of patient participation, we invited adolescents with type 1 diabetes to participate in a series of discussions by video conferencing between two pediatric diabetes clinics in Switzerland and Quebec. From those interactions resulted an exchange project among adolescents.
Objectives: To share life experiences with diabetes as well as tips for proper diabetes management and maintaining motivation for continued care while making a step towards more independence and responsability.
Methods: Description of the various steps involved to organize this exchange for 22 teenagers (average age 15.5 years, 12 girls and 10 boys) and their caregivers. Eleven Quebec adolescents were welcomed by the 11 Swiss teenagers and their family for a week of activities and reciprocally. Questionnaires to evaluate the quality of life (DQOL) were completed before and three months after the exchange. The results were compared to a control group.
Results: During this summertrip, these young people demonstrated to themselves their ability to manage diabetes, they gained independence and learned how to manage difficult situations such as ketosis on a trek with an overnight stay in a mountain shelter, jet lag, hypo - hyperglycemia and different food choices. The role of the coaches was to allow for new experiences in a save setting. Preliminary results of the analysis for the quality of life pre and postexchange are encouraging, indicating a positive impact on the adolescents who participated in the project.
Conclusion: This Swiss-Quebec exchange has allowed the adolescents to reach the pre-established goals since interactions within the group lead to promoting more optimal diabetes management, gain in maturity, greater autonomy and assertiveness. We noticed a less negative perception of their health condition and particularly bonding between peers. We saw positive attitude changes and even enthusiasm for the initiation of new therapeutic regimens.

P-426-242

Remission without insulin therapy on gluten-free diet in a six-year old boy with type 1 diabetes

S.S. Møller[1], K. Buschard[2], S. Fredheim[1], S. Porksen[3] & J. Svensson[1]
[1]*Herlev University Hospital, Copenhagen, Paediatric Department, Herlev, Denmark;* [2]*Copenhagen University, Copenhagen, Denmark;* [3]*Roskilde University Hospital, Roskilde, Denmark*

Objectives: To test if gluten-free diet prolongs remission in a newly diagnosed child without celiac disease.
Methods: Case-report, follow-up on a published case-report in BMJ case-reports 2012.
Results: A lean 5 year old boy was diagnosed with type 1 diabetes (T1D) with classical symptoms and GAD positive may 2010. Following nutritional advice the patient was started on a gluten-free diet with a low glycaemic index. The average calorie intake was 7085 KJ/day split into 6-7 courses, with 24% energy from carbohydrates, 26% from protein and 49% from fat, after 2-3 week without need of insulin treatment. Hba1c at onset was 10.4% and 7.8% at initiation of glutenfree diet. It has stabilized at 5.8-6.5% without need insulin except for four shorter periods with either infections or signs allergy, where 1-2 units a day kept blood glucose within target. Fasting blood glucose is maintained at 4.0-5.0 mmol/l. C-peptide and proinsulin has been tested 8 and 12 month post onset and shown a steep decline. Lipids are all normal.
Conclusions: His insulin production seems to have decreased but he manages to stay within targets and with low HbA1c indicating an increase in sensitivity. After 24 month he is still without daily insulin. There was no alteration in GAD positivity. The gluten-free diet was safe and without side effects.

P-263-243

Evaluation of an education program for parents of children with type 1 diabetes

C. Morin[1], M. Talvard[1], K. Barre[2], C. Rohou-Vitrand[2], C. Belval[2], P. Lartiguet[2] & C. Le Tallec[1,2]
[1]*Hopital des Enfants, Diabétologie Pédiatrique, Toulouse, France;* [2]*Association Enfance Adolescence et Diabète Midi-Pyrénées, Toulouse, France*

Introduction: A program updating and reinforcing knowledge for parents was established in October 2009 to complete the therapeutic education programs for children.
Method: Fifty-nine parents of 34 children aged 4-17 years participated in this program.
Results: The program allows a better knowledge for parents, a modification in daily practices, improving the relationship between the parent and child living with diabetes. There is a decrease in the number of hospitalizations for ketoacidosis and severe hypoglycemia but HbA1c children are not improved by the program.
Conclusion: Parents are satisfied with the organization of the program and the content of the sessions. Parents' suggestions were taken into account to improve this program since its inception.
Keywords: Therapeutic education program, diabetes, children, parents, knowledge.

P-157-244

Transition of teens with type 1 diabetes - moving towards a model of care for adolescents with chronic conditions at our hospital

K. Newton[1]
[1]*Capital and Coast District Health Board, Endocrine, Diabetes & Research, Wellington, New Zealand*

Objectives: To develop a model of transitional care for adolescents with diabetes that will best meet the needs of all stakeholders (teens, families, health professionals).
Methods: A quantitative retrospective audit (2005–2011) of teens/young adults case notes who have already left the paediatric

service; an observational survey of a number of these teens' experience of transfer by semi-structured interview; focus groups of stakeholders (teens/young adults, parents, general practitioners, clinic staff); development of a transition model.
Results: The audit showed approximate increase in HbA1c of 0.5% between transition and audit (P = 0.08), timeliness of transfer appointment in young adults diabetes clinic, and that few were lost to follow up. Most teens did not have strong opinions about transfer to the young adult service and how it could be done differently; parents were concerned about access to prescriptions and less regular appointments than those offered in the paediatric service; GPs were unclear about their role.
Conclusion: A transition model was constructed for the diabetes service based on the feedback received from stakeholders.

P-39-245

Tanga - Tanzania: abstract on diabetes mellitus researchb

E.L. Kitiku[1,2]
[1]*MUHAS - Dar es Salaam, Medicine, Tanga, Tanzania, United Republic of;* [2]*Bombo Hospital, Medical, Tanga, Tanzania, United Republic of*

Introduction: Tanga city has eight Districts. diabetes care done only in two centres. The purpose of giving management and care is to prevent diabetes complications. Bombo Hospital has 1580 patients since 2004 Jan. up to Mar. 2012. Females are more affected than Males. The diagnosis is done to those clients who are sick. The monthly record of attendance kept to males and females, These including Patients on injection insulin, Type 1 patients, Children below 18 years, Patients on oral hypoglycemic drugs, Patients on diet and exercises, and Patients on diabetic complications. *Implementation:* Activities done are giving health education on diabetes in general predisposing factors, diet, life changes, exercise, self management, investigations and screening for diabetes complications, treatments, calculations of BMI, taking vital sign, filling of follow up forms.
Findings and solutions: Bombo Hospital has total patients of 1580 from 2004 To Mar. 2012. Other findings are underweight, (Male diabetes patients are more underweight than females). Healthy, Overweight, Obese, (Females diabetes patients are more obese than Males, and very obese also are Females). Greater than 75% diabetes patients are hypertensive. Healthy education on diet modification and exercise is needed, Greater than 50% diabetes patients has uncontrolled blood glucose, healthy education is needed. Greater than 85% type 1 and type 2 those on injection insulin are underweight.
Conclusion: (1) 95% diabetes patients didn't know the modified management and care on diet and self management including injection, storage, technique and sites even how to do if hypoglycemia occurs.
(2) 5% of healthy personnel have an idea on modified way of managing diabetes patients, there are obstacles hindering diabetes services due to poor resources.

P-452-246

The TEENS study: understanding glycemic control and quality of life in children, adolescents, and young adults with type 1 diabetes mellitus

L. Laffel[1], A. Cali[2] & C. Mathieu[3]
[1]*Pediatric, Adolescent and Young Adult Section, Joslin Diabetes Center, Boston, USA;* [2]*Sanofi, Paris, France;* [3]*Division Hormonology, Diabetes Subdivision, Katholieke Universitiet Leuven, Leuven, Belgium*

Objectives: Glycemic control in children, adolescents, and young adults with type 1 diabetes mellitus (T1D) is influenced by several patient factors, i.e. age, insulin regimen, self-monitoring, and psychological/socioeconomic factors. Identifying salient factors is critical for designing and implementing disease management programs aimed to
(1) optimize health outcomes and
(2) direct collaboration among all stakeholders managing diabetes over patients' lifetimes.
Methods: TEENS is an observational, multinational, cross-sectional study in children, adolescents, and young adults with T1D. Planned enrollment is 7000 patients aged 8-25 years, with a duration of T1D ≥1 years and onset age <18 years. Patients will be studied in 3 age strata (8-12 years [25% of planned enrollees], 13-18 years [50%], and 19-25 years [25%]. The primary endpoint is the proportion of T1D patients achieving target ADA/ISPAD HbA_{1c} goals, both overall and by age strata (<18 years: HbA1c <7.5% and ≥19 years: HbA_{1c} <7%). Secondary endpoints include patient and parent/caregiver health-related QoL and emotional status/behavior, as well as associated factors for glycemic control/QoL. Data collection will also include demographics, history of diabetes, complications, and treatment, as well as severe hyper-/hypoglycemic episodes.
Results: To date, 350 diabetes centers in 20+ countries across 5 continents have been recruited to identify a convenience sample of eligible patients. Patient enrollment began June 2012; interim results will be available early 2013.
Conclusions: Multiple challenges exist to assemble a multinational sample, including language and differences in healthcare delivery across the pediatric age range. This will be the largest multinational sample of pediatric patients assembled in the contemporary era of intensive therapy. Identifying factors related to glycemic control and QoL will inform future interventions aimed at improving care and outcomes in young patients with T1D internationally.
This study is supported by Sanofi.

P-5-247

'Join us on our journey': consultations with families and professionals to develop a new model of care for children and young people with type 1 diabetes

N.H. Kime[1]
[1]*Leeds Metropolitan University, Carnegie Faculty, Leeds, UK*

Objectives: The aims of the research, funded and supported by NHS Diabetes, were to develop a model of care for children and young people with Type 1 diabetes in England and improve their diabetes care provision.
Methods: Nine acute hospitals in the Yorkshire and the Humber region were recruited to participate in the research. Children and young people, aged 6-25, with Type 1 diabetes, their parents and health care professionals (approximately 300 participants), took part in talking groups (focus groups) and individual interviews to find out about their experiences of diabetes care provision.
Results: Findings show that there are key areas for improvement in the future diabetes care provision for children and young people, including psychological support, schools, structured education and transition. These have important implications for practice.
Conclusions: This study is the first of its kind to consult with families and professionals to find out about their experiences of Type 1 diabetes care provision in England. The research findings will add to the current evidence base by providing valuable and long-overdue information relating to what a care model for children and young people with Type 1 diabetes needs to look like.

P-392-248

The effect of a ``multiple intelligences theory'' based playing program on the quality of life in type 1 diabetic primary school children

I. Arslanoglu[1], S. Bapoglu[2], O. Yilmaz[3] & O. Kapisiz[2]
[1]*Duzce University School of Medicine, Pediatric Endocrinology, Duzce, Turkey;* [2]*Duzce University School of Health Services, Child Development, Duzce, Turkey;* [3]*Duzce University School of Medicine, Biostatistics, Duzce, Turkey*

Objectives: We present an experimental prospective study designed to check the usefulnes and efficacy of the Multiple Intelligences Method in order to enhance disease acceptance and quality of life in type 1 diabetic children.
Methods: Seventeen type 1 diabetic children (10 girls and 7 boys aged 10.05 ± 1.14 years) were exposed to a play based program specificly developed to overcome diabetic problems in the light of Multiple Intelligences Method twice weekly 4 weeks long (total 12 hours). This program aimed to stimulate 8 different intelligence components with the intention to upgrade the patients perceptions about their disease in a positive direction. Before and after the whole period Kid-KINDL QOL Questionnaire (consisting of 24 items comprising of 6 dimensions, i.e. physical wellness, emotional wellness, self-respect, family, friend and school developed for kids aged 8-11) All group practices were video-recorded.
Results: According to the questionnaire, there was increase in every item at the and wich was statistically significant for only physical wellness dimension (paired *t*-test).
Conclusions: This playing program designed to stimulate various intelligence compartement in the children wich are subject to diabetes education encourages them to be active participants. This program can be used to enhance the efficiency of education programs as well as the quality of life of diabetic children.

Table: QOL scores at start and end (mean ± SD).

Kid-KINDL subdimensions	Start	End	P
physical wellness	75.0 ± 18.3	83.3 ± 16.8	0.063
emotional wellness	77.5 ± 17.3	88.3 ± 13.3	0.046
self-respect	60.4 ± 21.1	64.2 ± 27.5	0.665
family	82.1 ± 15.7	88.8 ± 13.4	0.15
friend	86.3 ± 12.6	87.1 ± 13.5	0.855
school	72.9 ± 16.5	77.5 ± 23.1	0.425

P-415-249

Satisfaction with diabetes appointments at youngsters' department

D. Matos[1], M.-J. Afonso[2], M. Barradas[2], M. Dingle[1], L. Narciso[2], D. do Ó[3], A. Pereira[2], L. Serrabulho[3] & J.-F. Raposo[3]
[1]*APDP - Diabetes Portugal, Youngsters' Department, Lisbon, Portugal;* [2]*APDP - Diabetes Portugal, Nutrition Department, Lisbon, Portugal;* [3]*APDP - Diabetes Portugal, Lisbon, Portugal*

Objectives: All aspects of the consultation environment are extremely important for the success of interaction between Health Care Providers (HCP) and the person with diabetes (PWD). A shared waiting room for PWD of all ages can be particularly challenging for parents and children. In Portuguese Diabetes Association (APDP) we have a new paediatric facility with rooms for group and individual appointments. The aim was to evaluate parents' and youngsters' opinions about HCPs diabetes care and about the environment of diabetes appointments.
Methods: We evaluated a convenience sample of 51 parents and youngsters who attended consultations at APDP. Parents and youngsters fulfilled a questionnaire about satisfaction with diabetes consultations. A quantitative study was conducted to analyse data.
Results: We inquired aspects related to:
- *Consultation accessibility: Waiting time* - satisfied (60%), very satisfied (30%); *Information* - satisfied (39%), very satisfied (61%).
- *Consultation environment: Organization* - satisfied (31%), very satisfied (67%); *Privacy* - satisfied (25%), very satisfied (73%);); *Adequate Space* - satisfied (29%), very satisfied (71%).
- HCPs (doctors, nurses, dieticians, psychologist) sympathy, availability, information, competence: 18 - 25% satisfied, 72–82% very satisfied.
- *Other personnel*: satisfied (40%), very satisfied (60%).
- *Service quality*: satisfied (33%), very satisfied (67%).
Conclusions: In this sample, parents and youngsters evaluated positively the introduction of this new facility. These aspects should be constantly evaluated to keep and improve the conditions where care takes place. Part of the success of health outcomes is related to the conditions here evaluated. A centre that provides good quality of care should be able to keep track of the environmental aspects of a consultation.

P-466-250

Multicenter, crossectional analysis of glycated hemoglobin HbA1c and its individual trends in Polish children with longer duration of type 1 diabetes

P. Jarosz-Chobot[1], J. Polanska[2], M. Mysliwiec[3], A. Szadkowska[4], W. Fendler[4], H. Kaminska[5], M. Chumiecki[5], B. Mianowska[4], I. Techmanska[3], B. Sztangierska[3], W. Mlynarski[4] & PolPedDiab Group
[1]*Medical University of Silesia, Katowice, Poland;* [2]*Silesian University of Technology, System Engineering Group, Gliwice, Poland;* [3]*Medical University of Gdansk, Gdansk, Poland;* [4]*Medical University of Lodz, Lodz, Poland;* [5]*Upper Silesia Center for Child Health, Katowice, Poland*

Objective: To analyze HbA1c and its individual trends in children with longer duration of type 1 diabetes (T1DM).
Material: We analyzed an epidemiologic database (years 2006-6009) of 7783 HbA1c values from 996 children (531 boys) with T1DM originating from three academic centres (Gdansk, Lodz, Katowice) in Poland. Patients were aged 0-18 years and mean duration of diabetes eequalled 6.9 ± 2.3 years (2 to 10 years).
Results: Total mean HbA1c was 7.6 ± 1.5% (in age groups: 7.0 ± 0.8% 0-5 years; 7.1 ± 1.0% 6-10 years; 7.8 ± 1.7%11-19 years) without differences dependent on gender. HbA1c increased significantly with age and longer T1DM duration. HbA1c values differed significantly between centers. A stable course of T1DM was noted in 817 (82.0%) children (mean HbA1c 7.6 ± 1.4%). Significant increase of HbA1c was observed in 125 (12.5%) and decrease in 54 (5.4%) children, with a similar dynamics of 0.8 ± 0.8% per year. Number of HbA1c examinations was higher in patients with evidence of HbA1c trend. The first HbA1c values included in the study characterized by individual trend significantly differed among the subgroups. Decreases were characterized by higher initial values and these with increase by significantly lower initial HbA1c. 455 (55.7%) children reached a stable course with HbA1c < 7.5% and 110 (13.5%) had HbA1c levels >9%. Mean HbA1c ≤6.5% was found in 150 children (18.4%).
Conclusions: More than 50% Polish children with longer T1DM duration achieve an international target of glycemic control (HbA1c). Age, T1DM duration and center-specific factors influence HbA1c values. A majority of children with T1DM can reach a stable course of the disease. Decreasing trends of

HbA1c values usually suggest an intervention from diabetic team coupled with more frequent HbA1c examination.
Study supported partially by grant NN519579938.

P-124-251

Blood draw worries and perception of pain in 12-24 month old children participating in The Environmental Determinants of Diabetes in the Young (TEDDY) study

J. Melin[1], M. Hansen[1], G. Hansson[1] & TEDDY Study Group
[1]*Lund University/CRC, TEDDY Study, Malmo, Sweden*

Objectives: TEDDY investigates triggers of islet autoimmunity in Sweden, USA, Finland and Germeny in children followed from three months of age with blood draws every third month until four years of age. The lack of understanding of frequent blood draws promted the question whether blood draws in 12-24 months old children affected perception of worries, fears and pain in parents compared with nurses. The aim of this study was to assess perception of blood draw worries, fears and pain in healthy children.
Method: Parents (n = 70) and the nurses (n = 3) completed Likert-scale questionnaires after the blood draw at 12, 18 and 24 months visit. The anonymous questionnaires were administered during May 2010 - February 2012.
Results: Worries *before* the blood draw with increasing age of the child did not differ in parents (no worries were 71, 70 and 62.5%, respectively; P = 0.51) and nurses (80, 71 and 71.2%; P = 0.43). Parents (P = 0.06) but not the nurses (P = 0.37) tended to increase their worries *during* the blood draw with increasing age of the child. In contrast, the perception of pain in the child decreased with increasing age of the child in the parents (P = 0.04) but not in the nurses (P = 0.17).
Conclusion: Fear and worries before and during the blood draw tended to increase with increasing age the child in parents but not in nurses. While the perception of pain with increasing age of the child did not change among the nurses, the parents perceived less pain with increasing age. Parents and nurses differ in blood draw worries and perception of pain in 12-24 months old children.

P-445-252

Pump maintenance program initiated to avoid increase in A1C 6 months to 1 year following initiation of continuous subcutaneous insulin infusion (CSII)

M. Dawe[1] & B. Seeley[2]
[1]*London Health Sciences Centre, Paediatric Diabetes, London, Canada;*
[2]*London Health Sciences Centre, Paediatric Diabetes (Paediatric Medical Day Unit), London, Canada*

Objective: Research has shown an improvement in A1C with initiation of CSII. We found in clinic this is often followed by a gradual increase in A1C. We initiated a mandatory pump maintenance workshop that is to be attended by all families that have started CSII within 6 months to a year. Our objective is to re-motivate and educate our patients and their families within 1 year of pump start to prevent an upward trend in A1C.
Method: Patients were invited that had started CSII within 6-12 months and others who may benefit from review. Adolescents and caregivers interacted with a guest speaker and reviewed basic pump strategies, followed by a session on problem solving blood sugar numbers. They were then separated into two groups in a peer support format for discussion. Concurrently, the school aged children (aged 8 - 12 years.) reviewed pump basics, site insertion and diabetes challenges. A motivational speaker with T1 DM and former Olympic rower, concluded the program.
Results: The mean age of the patients attending this program was 12.3 ± 5.3 years. We found that the mean A1C in the 6 months prior to program was 7.7%. Six months after the mean remained stable at 7.9%. Diabetes outcomes are based on A1C results, but psychosocial aspects are also important in chronic disease management. The teens(N = 11) and parents(N = 16) did evaluations. The school aged (n = 7) did not fill out a feedback forms due to their age. The feedback was positive and information helpful in managing CSII. The negative feedback was the length of talks. All groups commented the positive social interaction with others that have diabetes and motivational speaker.
Conclusion: The A1C's remained generally unchanged 6 months after program attendance. This is considered a success as our typical A1C results are higher in the year following initiation of CSII. The psychosocial benefits to the families and children/teens with diabetes were also evident in the feedback we received from the families.