Poster Session I: Diabetes Acute and Chronic Complications I

P/001/WED

The effect of age at onset type 1 diabetes on the development of diabetic nephropathy in children and adolescents with T1DM

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Objective: To analyze the impact of age at onset on the development of diabetic nephropathy children and adolescents with T1DM.

Methods: We studied children and adolescents in whom type 1 diabetes mellitus (T1DM) was diagnosed before the age of 15 years between 1992 and 2005 years in a Moscow district. MAY screening [albumin excretion rate (AER) in three timed overnight samples: mean AER ≥30 mg/day and ≤300 mg/day)] was performed yearly after 10 years of age from diagnosis. For the analysis, the patients were divided into three groups: those who were aged < 5 years (n = 95), 5–10 years (n = 106) and > 10 years at diagnosis (n = 62) enabled the evaluation of the effect of diabetes duration and on the development of MAY. Kaplan-Meier survival analyses (log-rank test) estimated the probability of developing MAY.

Results: Two hundred and sixty-three (263) T1DM children and adolescents, mean age of 12.9 years, mean diabetes duration of 5.8 years and mean age at onset of diabetes of 6.9 years were selected for the study. Cumulative probability for MAY was 10.2% after 10 years. Among those aged < 5 years at diabetes onset, the probability for MAY was 5.4% after 10 years of diabetes duration. This same probability was achieved after only 1 year among those who were diagnosed with diabetes > 10 years of age. MAY remained constant over time among the oldest age-at-onset group (5–10 years, - > 10 years), while in the youngest age-at-onset group (< 5 years), the cumulative probability for MAY started to increase after a period of 8 years of diabetes. After 10 years of diabetes, in the group with a diagnosis before the age of 5 compared with the two other groups, cumulative probability of microalbuminuria was lower (age at diagnosis < 5 years: 5.4%; 5–10 years: 28.5%; > 10 years: 33%; log rank test $P < 0.05$).

Conclusions: Children diagnosed with T1DM at younger age seem to prolong the time for developing MAY.

P/002/WED

Improved outcomes in DKA management in an intermediate care unit

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Background: The mortality rate from diabetes ketoacidosis (DKA) in children is 0.15–0.30%. The knowledge and expertise of the medical and nursing staff is essential to the safe and effective resolution of DKA.

Objectives: To evaluate quality of care outcomes specific to DKA therapy in a pediatric intermediate care unit (InCU) with staff specially trained in DKA management.

Methods: In a retrospective chart review, 30 consecutive patients treated in the InCU at Children's Hospital Boston (CHB) were compared with a similar cohort of patients treated in the Intensive Care Unit (ICU) and the ward. Factors compared were duration of time spent on an insulin infusion to resolution of DKA (anion gap < 12), time to first subcutaneous insulin dose, rates of hypoglycemia (< 60 mg/dl) and hypokalemia (< 3 mmol/l).

Results: In the InCU as compared to ward and ICU, mean time in hours to resolution of DKA was reduced (InCU 6:58 ± 3:30 vs. ward 13:16 ± 4:03, $P = 0.003$; InCU vs. ICU 10:37 ± 6:04, $P = 0.007$), mean time to first SC insulin was reduced (InCU 13:42 ± 5:23 vs. ward 19:49 ± 9:08 hours, $P = 0.003$; InCU vs. ICU 21:55 ± 11:52, $P = 0.001$), hypoglycemia was eradicated in the InCU (InCU 0% vs. ward 5% vs. ICU 3%), and hypokalemia rate was increased in InCU and ICU (InCU 31% vs. ward 13% vs. ICU 72%). Incidence of cerebral edema in the InCU over 5 years was 0.5%.

Conclusions: The centralization of DKA care in an InCU resulted in significant improvements in outcomes. As international standards for these measurements have yet to be established, comparison is only currently possible within our institution. Reducing the duration of DKA may enhance patient safety by increasing time for diabetes teaching and shortening hospital length of stay. Increased incidence of hypokalemia may be attributable to fluid changes that were designed to reduce the hypoglycemia rate. Further research is needed to establish the longer term benefits of these interventions and their applicability in institutions outside our own.

P/003/WED

Factors contributing to terminal digital preference in 91398 patients with diabetes mellitus in Germany and Austria: possible impact on therapeutic decisions

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Aims: Correct blood pressure measurements are decisive for appropriate diabetes management. The accuracy of blood pressure (BP) readings might be negatively influenced by systematic errors such as terminal digital preference (TDP). TDP describes an observer's tendency to record the measurements using certain digits. As TDP might interfere with diabetes treatment, we used the binational Diabetes databank DPV to study the rate of and factors contributing to TDP.

Methods: A total of 580578 BP readings were documented in 286 participating centers, 494301 measurements from patients with type 1 and 86277 from patients with type 2.

Results: Total TDP for the digits "0" and "5" was 55 ± 50% and more frequent in smaller centers, rehabilitation centers, in non academic and in outpatient centers. A lower rate for TDP was found in Pediatric centers and centers treating patients with type 1 diabetes, in Austrian and West German centers compared to East German centers. Within the last 14 years, TDP increased with age and declined in type 1diabetes, but not in type 2 diabetes centers. Levels of systolic BP were significantly lower in centers positive for TDP.

Conclusions: TDP is common among German diabetes centers. Profound differences between centers depending on the type of diabetes and the regional differences were found. Pediatric centers appear to be less susceptible for TDP. As TDP might be associated with insufficient BP management BP readings need to be improved by training academic and non-academic employees and by using automated BP devices.

P/004/WED
Evaluation of blood β-ketone measurementβ in diabetic ketoacidosis

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The accumulation of ketones in the blood is called ketosis and may lead to diabetic ketoacidosis (DKA). If untreated, DKA can lead to coma and death. β-hydroxybutyrate (β-OHB) and acetoacetate are the two main ketone bodies. Acetone, the third ketone body, is present in much lower concentration. The aim of this study was to evaluate the use of blood beta β-ketone strips during the diagnosis and follow up of type 1 diabetic patients with DKA. This study had been applied on 120 capillary blood samples in comparison to blood glucose, blood PH, blood gasses, and urine sample for glucose & acetone. The results showed that the new β-ketone test strips provided accurate results in fingertip samples and it was more predictable than urine acetone. The blood β-ketone test strips was correlated with more accuracy with the blood pH, blood electrolytes and dehydration state. All the indices of DKA was significantly correlated with the measurements of β-ketone bodies test strips, while urine acetone gave a lot of false results that make it undependable for the daily diagnosis and follow up of the DKA. It was recommended to use these β-ketone strips for diagnosis and follow up of diabetic patients with DKA as it takes only 10 seconds per test, easy to use, mostly painless, requires less blood, and the blood results give a numerical result, which may be easier to interpretation than comparing a color to a chart that reduces the use error due to timming or visual interpretation of colors and gives more accurate clinical information.

P/005/WED
Evaluation of the effect of type 1 diabetes mellitus on the auxological data of children

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Objective: To evaluate the effect of type 1 diabetes on growth and other auxological data in children.
Subjects and methods: The inclusion criteria were: (i) A follow-up duration of at least 1 year, (ii) not having achieved near-final height at the presentation, and (iii) not having an associated disorder (e.g. celiac disease, pubertal delay) that could affect growth. The patients followed in our center since the diagnosis were included in Group A while the others in Group B. Then, for each disease year, the patients in Group A were divided into two subgroups as Group A1 (those who maintained or improved their height SDS) and Group A2 (height SDS of whom deteriorated).
Results: A total of 248 patients with type 1 diabetes were included. The study consisted of 130 patients (M/F:70/60) after excluding 118 patients. The mean age at the diagnosis was 8.4 ± 3.6 years. Group B consisted of 29 cases (22%, M/F:15/14), who presented after a mean of 3.8 ± 2.6 years following diagnosis. The mean values of auxological variables at the diagnosis in Group A (M/F:55/45) were as follows: Weight SDS: -0.3 ± 1.1, height SDS 0.3 ± 1.1, BMI SDS -0.6 ± 1.4. Their mean target height SDS was -0.2 ± 0.8. The mean height SDS of the patients in Group A did not change significantly during the follow-up. Additionally, weight and BMI SD scores were similar during the course of the disease, except a significant rise observed by the end of first year. The comparisons between Groups A1 and A2 revealed that diagnosis following ketoacidosis was significantly associated with maintaining or gaining height SDS at the 4th year of diagnosis ($P = 0.03$). On the other hand, mean HbA1c level was modestly negatively correlated with the course of height SDS at the 3rd year of diagnosis ($r = -0.3$, $P = 0.03$).
Conclusion: No significant deteriorative effect of type 1 diabetes on auxological parameters was observed. Some clinical and laboratory variables related with metabolic control were found to correlate with growth.

P/006/WED
Adiponectin, leptin, and lipid profile in type 1 diabetic children and adolescents

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Background: Adipose tissue is known to produce and secrete a variety of bioactive substances known as adipocytokines. Adiponectin and leptin are considered to be among the most important adipocytokines: Objectives: To explore the relationships between adipocytokines (adiponectin and leptin), lipid profile and diabetic control indices in type 1 diabetic subjects.
Subjects and methods: In this study 63 clinically diagnosed type 1 diabetic subjects and 30 age and sex-matched healthy control subjects were analyzed. Age, sex, diabetic duration, family history of diabetes, daily insulin dose, weight, height, body mass index, systolic and diastolic blood pressure were recorded. Fasting blood glucose, glycated hemoglobin A1c, total hemoglobin, Lipid profile and plasma levels of adiponectin and leptin were measured in type 1 diabetic subjects and control subjects.
Results: In this study a significant increase in triglycerides and HDL-cholesterol of type 1 diabetics as compared to normal control subjects. In type 1 diabetic subjects, plasma adiponectin was significantly elevated while leptin showed a significant decrease as compared to normal control group. Leptin showed a positive correlation with body mass index, and systolic blood pressure, while it showed a negative correlation with both fasting blood glucose and glycated hemoglobinA_{1c}.
Conclusion: The results of this study revealed that leptin but not adiponectin has a significant correlation with glycemic control indices.
Key words: adipocytokines, adiponectin, leptin, lipid profile and glycemic control indices.

P/007/WED
Challenges of foot care in Cameroon

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Background: Previously common foot ulcers in Cameroon were tropical ulcers mainly infested with streptococcal bacteria or mixed streptococcal and staphylococcal pathogens, but the emergence and prevalence of HIV/AIDS epidemic has now resulted in high prevalence of Kaposi sarcoma. The leading diabetes complications here are foot ulcers and if studies (University of Capetown-UCT2006) proof that highly active anti-retroviral therapy (HAART) increases the chances of type 2 diabetes mellitus (T2D), then many more ulcers will be seen in diabetes clinic in the near future, perhaps with high chances of lower limb amputations.

Method: The clinic archives were analysed for the prevalence of HIV, diabetes, dual diagnosis of diabetes and HIV, frequency of ulcers and the sero-status of the general patients seen at the clinic as well as their fasting plasma glucose tests.
Result: Factors noted to be responsible for the steadily rising foot ulcers especially with diabetics is prior history of obesity mostly secondary to sedentary lifestyles, poor sugar results due to either poverty or ignorance, lack of foot exam and vascular assessment in clinics, HIV in diabetes, injuries from farms ranging from minor to severe.
Conclusion: The leading complication of diabetes here is the foot. Approach of HIV advocacy is seemingly successful through education and sensitization which we are looking forward to adopting the method for diabetes and obesity advocacy. Through these, diabetes epidemic maybe successfully slowed, coaster-roller glucose improved with HbA1Cs which can drastically reduce ulcers. Other factors influencing obesity like cultural and sedentary lifestyle can be better handled through this same approach.

P/008/WED
Withdrawn by author

P/009/WED
Huge transient elevation of liver enzymes during diabetic ketoacidosis

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Introduction: Abnormalities of hepatic function have been reported in diabetic children with ketoacidosis. We report the story of a 13.5 years old boy with type 1 diabetes and transient fulminant hepatitis.
Case report: Our patient, with diabetes onset at 11.5 years had a poor metabolic control: HbA1c varied between 11 and 14.4%, due to non-compliance and omission of insulin injections. The normal mean daily insulin dose was supposed to be 1.1 U/kg. The staturo-ponderal evolution was normal. There were no complications. The teenager has been followed in our diabetology clinic for 1 year. At 13.2 years, he was hospitalised in another clinic for ketoacidosis; the hepatic enzymes were normal. Two months later, he was rehospitalised for severe ketoacidosis: the pH was at 6.9 with bicarbonate at 6 mEq/L; HbA1c rose to 14.4%. He developed a fulminant hepatitis. Liver enzymes were extremely increased: AST: 3448 UI/l (N: 15-40), ALT: 934 UI/l (N: 10-40), gGT: 782 UI/l (< 17) and LD: 2861 UI/l (N: 240-480). Hepatomegaly with steatosis was confirmed by ultrasound examination. Infectious, metabolic or autoimmune origins were excluded. After 72 hours of insulin, the glycemia were almost normalised, and the hepatic enzymes dramatically decreased. Given this fast improvement of the liver function, no hepatic biopsy was performed. After 3 weeks, the hepatic enzymes were nearly normal and the ultasound control showed neither hepatomegaly nor steatosis. In the literature, authors report some histological descriptions of hepatic biopsies showing steatosis and glycogen excess as described in some storage diseases.
Conclusion: This 13.5 years old patient, with type 1 diabetes having an extremely poor metabolic control, had the most severe deterioration of the hepatic function ever described. The hepatic enzymes returned to normal values within 3 weeks with concomitant normalisation of blood glucose. In the event of diabetic ketoacidosis, it is essential to monitor hepatic function.

P/010/WED
Is better metabolic control achieved by increasing frequency of insulin injections?

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Objectives: The Diabetes Control and Complications Trial demonstrated intensive insulin regimens delayed onset and slowed progression of complications. Glycaemic control improved with increased Body Mass Index (BMI) and hypoglycaemia. The Northern Ireland Audit showed poor control in children on 4 or more insulin injections with mean glycosylated haemoglobin (HbA1c) level of 8.8% and 20% HbA1c < 7.5%. Our study aimed to measure changes in HbA1c, BMI and hypoglycaemia in patients attending the Royal Belfast Hospital for Sick Children diabetes clinic after insulin regimen change to 3 or more injections daily. Also, to compare with a control group on twice daily insulin.
Methods: Data was collected on children and adolescents with type 1 diabetes attending the clinic with insulin regimen change. Patients with newly diagnosed diabetes or frequent changes were excluded. Paired t-tests were used to compare groups.
Results: 95 patients aged 8–21 years (mean 15 years) were on 4 or more daily insulin injections. Regimen change at a mean of 11 years (4–16 years) from 1997. After 2 years mean HbA1c (with standard deviation) decreased from 8.4% (1%) to 8.3% (1.1%) with 22% HbA1c < 7.5%. Mean BMI increased from 22.1 (3.9) to 22.2 (4.1).
Eighty-four patients aged 5–21 years (mean 13 years) were on 3 insulin injections from 2001, with mean age at change 10 years (3–15 years). HbA1c levels increased from mean 8.1% (1.1%) to 9.1% (1.5%) in 2 years with 44% HbA1c < 7.5%. Mean BMI increased from 21 (2.7) to 22.3 (3.7).
Control group of 50 patients aged 5 to 16 years (mean 9 years) on twice daily insulin identified. Over 2 years HbA1c levels increased from mean 7.3% (0.6%) to 8.3% (0.9%) with 41% HbA1c < 7.5%. BMI increased from 18.4 (3) to 18.2 (2). Hypoglycaemic episodes were more frequent.
No statistical differences demonstrated.
Conclusions: No differences in HbA1c, BMI or hypoglycaemic episodes noted. The numbers too small for positive effects. The study does not account for confounding variables.

P/011/WED
Back to the future: a case of diabetic retinopathy regression after 6 months of insulin pump therapy and continuous glucose monitoring

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We report a case of a patient with 19 years of poorly compensated type 1 diabetes mellitus (T1D) (mean HbA1c = 10%) who showed signs of diabetic retinopathy (DR) regression after

6 months (from diagnosis of retinopathy) of intensive insulin treatment with insulin pump and continuous glucose monitoring system (CSII + CGMS). Initial fundus oculi examination, fluorangiography, and OCT scan showed signs of significant non-proliferating DR with hemato-retinal barrier rupture and important areas of capillary nonperfusion in the right eye. The patients' multiple injection therapy (MDI) was substituted with CSII + CGMS, and in the following 6 months HbA1c levels reached near normalization levels, hypo- and hyperglycaemic events were significantly reduced (HbA1c = 6.4%, Avg $AUC_{>180}$ = 3, Avg $AUC_{<70}$ = 0.5), and eye exams showed a significant regression in the rupture of the hemato-retinal barrier and improvement in capillary perfusion. Prolonged hyperglycaemia is the major pathogenetic trigger of diabetic complications (DC). However, the results of the Diabetes Control and complication Trial showed that near normalization of glucose control (HbA1c = 7.5%) via MDI delayed the onset of DC in patients with short duration of diabetes, but was unable to induce the remission of complications already present at the beginning of the Study itself. Nontheless, hypoglycemia remained a limiting factor in reaching optimal HbA1c. Other studies have showed that prolonged near-normalization of glucose control (GC) via pancreas transplantation may induce regression of diabetic nephropathy, demonstrating the reversibility of DC. The recent improvement in biomedical devices such as CSII + CGMS which allow the near normalization of GC raises the possibility to induce regression of DC using non-invasive techniques.

Poster Session II: Diabetes Acute and Chronic Complications II

P/012/FRI

Cardiovascular autonomic neuropathy in children with type 1 diabetes mellitus

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Diabetic cardiovascular autonomic neuropathy (DCAN) revealed in children may determine the severe cardiovascular complications in those as adults. Nevertheless few data exist on diagnostics and prevalence of DCAN in children with diabetes.

Objectives: To evaluate the prevalence of cardiovascular autonomic neuropathy in children with type 1 diabetes mellitus (T1DM) and its possible relationship to the duration of disease and metabolic control.

Methods: We investigated 40 patients aged 7–16 years with T1DM. Pts were subdivided into 3 groups: group 1 (duration of disease - < 1 year, n = 12), group 2 (duration of disease – 1–5 years, n = 16), group 3 (duration of disease - more than 5 years, n = 12). They were compared with 40 nondiabetic subjects matched for age and sex. The battery of standard tests and heart rate variability analysis were performed for DCAN diagnostics.

Results: DCAN was revealed in 2 patients (12.6%) in group 2, and 5 (41.7%) in group 3. In addition: 33.3% of children in group 1, 43,8% - in group 2, and 58.3% in group 3 presented impaired (insufficient) parasympathetic innervation according to HRV indices. There were no specific trends of variables in nondiabetic controls. DCAN degree was positively correlated with disease duration (P = 0.01) and HbA1c after adjustment for the first mentioned (P = 0.03).

Conclusions: Early signs of DCAN may be revealed in diabetic children by HRV. The patients who present DCAN need a close follow-up and improvement of metabolic control.

P/013/FRI

24-hour ambulatory blood pressure monitoring in adolescents with type 1 diabetes with altered albumin excretion ratio or hypertension

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Background: Ambulatory blood pressure monitoring (ABPM) can identify alterations in the circadian pattern of blood pressure (BP) and hypertension in people with type 1 diabetes (T1DM). Furthermore, poor glycemic control is an important predictor for development of microalbuminuria (MA).

Aims: To describe disturbances in ABPM and metabolic features in adolescents with T1DM and altered albumin excretion and/or hypertension.

Methods: ABPM was performed in 16 pediatric subjects with MA and/or hypertension. Systolic nondippers were defined as a < 10% and diastolic nondippers as a < 20% fall in BP during the night. Hypertension was defined when systolic and/or diastolic BP was higher than 90th percentile for age, gender and height in more than 40% of records as recommended by Second Task Force on Blood Pressure Control in Children. MA was defined when albumin-to-creatinine ratio was higher than 3 mg/mmol.

Results: Mean age of the subjects was 14.6 (10.9–17.8) years. Mean diabetes duration was 7.2 (2.6–12.5) years; mean BMI-SDS 0.36 (-0.89 - 3.02), insulin dosage was 1.1 U/Kg/d (0.6–1.5) and average HbA_{1C} 9.1 (7.5–13.5)%. Girls had shorter diabetes duration (6.89 vs. 8.2 years). Mean BMI SDS was higher in female subjects (0.57 vs. -0.25) and so was median HbA_{1C} (9.3 vs 8.5). The prevalence for MA was 56.2% (7/12 girls and 3/4 boys). Mean systolic nondippers was 7.9% and mean diastolic nondippers was 14.7%. The mean systolic non-dippers was 7.4% in girls and 9.5% in boys. Mean diastolic nondippers was present in 3 out 4 boys while mean systolic nondippers was in 8 out 12 girls. Systolic hypertension was present in 2 out 16 subjects and diastolic hypertension was in 3.

Conclusions: Girls had worse BMI-SDS, HbA_{1C} and systolic nondippers probably due to an increased insulin resistance during puberty, but boys had a higher MA excretion. Our findings suggest that adolescents might present MA and nondipping status, despite a short duration of T1DM.

P/014/FRI

Withdrawn by author

P/015/FRI

Screening of autoimmune pathology associated with diabetes mellitus type 1 in children and adolescents

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Aim: Screening of autoimmune pathology associated with diabetes mellitus type 1 (T1DM).

Material and method: It is a prospective study covering the period 2003–2008.
The study group: 112 children with age between 3–8 years were divided into two subgroups: A. 24/112 children (21.42%) with T1DM onset in the last 5 years and B. 88/112 children (79.58%) already diagnosed with T1DM at the commencement of the screening. The subgroup A children underwent annual screening of the associated autoimmune pathology from the onset of T1DM while those in the subgroup B followed the elaborated protocol of ISPAD. Thyroid exploratory tests were performed: functional status (TSH, FT4), serological markers-antithyroid peroxidase antibodies (anti-TPO) and thyroid echography. Tissue transglutaminase antibody (TGA) and a*nti-endomysium* (*EMA*) were also tested. Adrenal autoimmune markers (21 hydroxylase antibody-AA21-OH) was determined in 37 adolescents.
Results: The study group had the following characteristics: average age 12.65 ± 3.06 years, duration of T1DM 5.54 ± 3.45 years. In the subgroup A, TSH value was 3.01 ± 2.6 μU/ml and FT4 1.93 ± 0.086 ng/ml, anti TPO was positive in 5/24 children.Two children presented with Goiter, one with hyperthyroidism and the other euthyroidism. The diagnostic workup of autoimmune thyroiditis has been: euthyroidism in 3/24 children, hyperthyroidism in 1/24 and subclinical hypothyroidism in 1/24. The screening performed in the subgroup B revealed TSH value 2.03 ± 1.53 μU/ml and FT4 1.32 ± 1.3 ng/ml, anti-TPO was positive in 11.36%. TGA and EMA was positive in 1/24 in subgroup A and 4.54% in subgroup B. Celiac disease histological confirmation was seen in 1 child- subgroup B who also follows a gluten free diet. Five adolescents (subgroup B) with T1DM evolution over 10 years presented positive AA21-OH.
Conclusions: T1DM has an autoimmune etiology and is associated with other endocrine entities. Autoimmune pathology screening should be performed from the onset of T1DM.

P/016/FRI
Type 1 diabetes and graves' ophthalmopathy in a 16-year-old girl: therapeutic challenges of a rare disease association

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Introduction: Graves' disease (GD) is uncommon in the pediatric age, but children have about the same risk as adults to develop Graves'ophthalmopathy (GO). Patients with type 1 diabetes mellitus (T1DM) have an increased incidence of autoimmune thyroid disease (30%). We report on a rare case of severe GD in a 16-years-old girl with T1DM.
Case presentation: The patient was referred to our centre at the age of 16 years (height: 171.5 cm, SDS 1.33; weight: 6.1 kg, SDS 1.27). She had T1DM since 10 years, treated with multiple daily injections. At the age of 14 years she developed prominent exophthalmos and lid retraction. She had hyperthyroidism (T3: 396 ng/dl, T4: 16.7 μg/dl, TSH < 0.01 μIE/ml), positive TSH receptor antibodies (TSHrAb 2.8 U/l) and thyroid enlargement. She received thiamazol 20 mg/day for 1 year, avoiding propylthiouracil as first line treatment because of the risk of liver failure in children. Treatment succeeded in controlling hyperthyroidism, but failed in treating GO. At time of referral to us the girl had poor glycemic control (HbA1c: 10.6%), was euthyroid, had GO grade 2 with severe keratoconjunctivitis sicca and corneal ulcerations, but no ocular hypertension. A MRI showed no involvement of the extraocular muscles and no optic nerve pathology. The patient received intravenous prednisone 500 mg/weekly for 6 weeks. After the first administration she experienced marked hyperglycemia that was treated with fractionated subcutaneous injection of rapid insulin analog. From the second administration we increased the basal insulin to 30% of the usual dose and were able to avoid severe hyperglycemia. Already after the first course of therapy the patients'GO showed a clear improvement.
Conclusion: High dose corticosteroid treatment was successful in treating a rare case of GO in a youth with T1DM. Close monitoring of blood glucose levels and a marked increase in insulin doses are necessary to avoid glycaemic dysregulation.

P/017/FRI
Cerebral crisis in severe diabetic ketoacidosis (dka) despite adequate fluid and insulin therapy

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Introduction: DKA is the main reason for a higher rate of mortality of children with type 1 diabetes mellitus (T1DM). The pathophysiology of the developing cerebral edema is not completely elucidated. We describe the occurrence of a cerebral edema in a patient with severe ketoacidosis in spite of treatment strictly according to the guidelines.
Case presentation: A 13 years old girl (T1DM since 4 years) presented at our hospital with vomiting. Her standard treatment consisted of Insulin detemir 50units (U) in the morning and Insulin aspart 3U per carbohydrate (carb) in the morning and evening and 2 U per carb at noontime. She appeared in a poor general health (weight 34 kg (<3.perc.), height 153 cm (10.perc.) without any neurological deficits. The laboratory findings showed the following results: pH 7.08; BE-21.8 mmol/l; blood glucose (BG) 430 mg/dl; bicarbonate 6.4 mmol/l, lactate 2.3 mmol/l; pCO_2 21.9 mmHg; Na^+ 128 mmol/l; corrected Na^+ 135 mmol/l; K^+ 4.3 mmol/l; HbA1c 9.5%, creatinine 1.1 mg/dl; urea 56 mg/dl. Initial rehydration with 500 ml ringer lactate (15 ml/kg/h) and i.v. insulin infusion (0.1 U/kg/h). After 1 hour reduction of fluid to 7.5 ml/kg/h, dose of insulin did not change. 2.5 hours after initiation of therapy the clinical condition of the girl deteriorated. She was somnolent with mydriasis and did not show any reactions to pain. BG was 269 mg/dl. Mannitol 20% 100 ml i.v. was given immediately over 15 minutes, the tomography revealed cerebral edema, the EEG showed a general bilateral alteration, particularly in the frontocerebral region. The girl recovered without sequelae.
Conclusion: This case report demonstrates that cerebral edema in DKA may present even when fluid and insulin therapy is administered according to current clinical guidelines. Thus, close neurological follow-up in DKA is mandatory. Clinical signs of cerebral edema should be treated immediately. As DKA presents a serious health challenge every effort of DKA prevention should have the highest priority.

P/018/FRI
Treatment of diabetic ketoacidosis (DKA) in two different centers with different regimens regarding fluid substitution and insulin dosing

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Objectives: We analyzed the treatment outcomes of DKA therapy in two German centers for pediatric diabetology in respect to duration until resolution of ketoacidosis, hypoglycemia during treatment and hypokalemia during initial treatment.
Methods: Retrospective analysis of all cases of diabetic ketoacidosis treated in the intensive care units in children and adolescents with diabetes with an age of 0–18 years in 1998–2005 in the children's hospitals in Leipzig and Chemnitz, Germany, using a standardized, computerized assessment form.
Results: 64 children and adolescents (23 in Center A and 41 in Center B) with a mean age of 11.4 years had been treated for DKA. Mean pH at diagnosis was 7.1 (6.84–7.29) initial bicarbonate was 8.5. Insulin substitution was started with 0.03 IU/kg in center A and 0.1 IU/kg in center B whereas initial fluid was 4.5 ml/kg in the first hour in center A and 10 ml in center B. Bicarbonate treatment was initiated in 16 patients of center A (70%) and in 8 patients in center B (17%). The different treatment regimens resulted in a slightly shorter duration of acidosis (8 hours in center A versus 6.5 hours in center B, not significant) but a significantly faster normalization of blood glucose in one center (18 hours vs. 10.5 hours). In addition, there was a significant difference regarding the development of hypoglycemia and hypokalemia between the treatment regimens. One patient (from center B) developed cerebral edema with minor sequelae.
Conclusion: Comparison of different treatment regimens of DKA in different centers will help to standardize and harmonize regional treatment schemes following international guidelines.

P/019/FRI
Relation profile of blood pressure and heart rate with microalbuminuria and metabolic control in children and adolescents with type 1 diabetes

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Introduction: The prevention of diabetic nephropathy is aimed at early detection of risk factors for the development of microalbuminuria, the most significant predictor of nephropathy.
Aim: To assess the frequency of microalbuminuria and relationship with other risk factors (HbA1c, blood pressure, BMI, duration of diabetes, puberty) for the development of diabetic nephropathy.
Methodology: In a cross-section study involving a group of 60 children and adolescence of both sexes, mean age 15.31 ± 2.43 years and with mean duration of type 1 diabetes 7.74 ± 3.44 years, we assessed the presence of microalbuminuria. Microalbuminuria was determined in 2–3 samples of the first morning urine in the period below 6 months, using turbidimetric method, in which the normal value was below 15 mg/l. Ambulatory blood pressure was monitored (SpaceLabs 90207).
Results: Of all our patients, microalbuminuria developed in 8 (13.3%) patients, mostly adolescents with completed sexual development, statistically significantly poorer metabolic control (9.79% vs. 8.70%) and higher BMI (23.59 kg/m^2 vs. 20.85 kg/m^2) than in the patients with normoalbuminuria. The duration of diabetes was statistically significantly related to urine albumin excretion (UAE), with a high statistical significance of the correlation between HbA1c and UAE and between BMI and UAE ($P < 0.01$). Mean night systolic blood pressure (SBP) was statistically significantly higher in microalbuminuria patients than in normoalbuminuria patients. Heart rate was statistically significantly related to night SBP. Mean arterial pressure nondipping was more frequent in the patients with microalbuminuria than in the patients with normoalbuminuria (62.5% vs. 38.5%), but without statistical significance.
Conclusion: Using univariant logistic regression, in our patients statistically significant risk factors for the development of microalbuminuria were: high HbA1c, BMI and night SBP.

P/020/FRI
Tracking of serum lipids in children with type 1 diabetes; effects of glycemic control, family history and diet

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Background: In patients with type 1 diabetes (DM1) poor glycemic control and abnormal lipid concentrations are associated with macro-and micro vascular complications. In the normal population, 50–70% of children with high lipid levels keep elevated concentrations at adult age. In DM1-children little is known about tracking of lipids and factors influencing lipid levels.
Objective: Tracking of lipid levels in DM1-children was evaluated and associated with glycemic control. Lipid concentrations were related to glycemic control, familial factors, BMI and diet.
Methods: In 116 DM1-children, lipid concentrations and glycemic control were retrospectively investigated from 1996–2007. In a subgroup of 38 children diet and family history was assessed. As control group we used 17 children without DM1 and data from literature.
Results: Cholesterol- and LDL-cholesterol concentrations were elevated (> 5.2 mmol/l, > 3.4 mmol/l) in 10.6% and 6.4% of DM1-patients. These values remained increased in respectively 50% and 83% of DM1-children. A high variability in HbA_{1c} percentage correlated positively with a high variability in cholesterol concentrations. Cholesterol concentrations were positively associated with DM1 duration, age and HbA_{1c}-percentage, but not with BMI or diet. Children with a positive family history for diabetes or cardiovascular disease had higher cholesterol-, LDL-Cholesterol- and lower HDL-Cholesterol-concentrations.
Conclusions: Tracking of lipid levels was shown in DM1-children and was associated with glycemic control. Regular monitoring of lipid concentrations in DM1-children and checking for associated cardiovascular risk factors is mandatory to identify DM1-children at high-risk for atherosclerosis. In these patients optimization of glycemic control should be pursued and treatment with lipid-lowering medication should be considered.

P/021/FRI

Does the age of children in the moment of diagnosis the diabetes may influence on abnormalities of growth hormone axis in children with IDDM

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The abnormalities of growth hormone axis play a great role in IDDM patients-in pathogenesis, complications, insulin resistance, dawn phenomenon and fat disorders.

The aim of the study was to estimate the influence of age, duration of diabetes and the age at the moment of diagnosis on growth hormone axis abnormalities in children with IDDM.

Material and methods: Seventh-seven patients and 15 age matched healthy children were included into the study. All children were prepubertal, suffering for IDDM for more than two years, without any coexisting diseases. All patients were divided into groups according to the kind of therapy.22 were treated with conventional insulin therapy, 21 with multiple insulin injection and 24 with continuous subcutaneous insulin infusion.There were no statistically significant differentials between groups as to the metabolic control,age,duration of diabetes,age at the moment of diagnosis of diabetes,weight,height and BMI. Blood and urine samples were taken between 7.30 and 8.30 a.m. in hospital in normoglycemia after the night without episodes of hyper or hypoglycemia. All analysis were made by RIA or ELISA commercial kits.

Results: The positive correlation between age at the moment of diagnosis and the dose of insulin and concentrations of IGF-1 and IGFBP-6 and negative correlation with the concentration of IGFBP-1 were observed in IDDM children whereas the age correlated positively only with IGF-1 concentration and negatively with IGFBP-1 and duration of diabetes only positively with IGFBP-1.In CSII group the positive correlations between age at the moment of diagnosis and GHBP and IGFBP-3 concentrations were also observed.

Conclusions: 1. The age of children in the moment of diagnosis the diabetes better correlate with growth hormone axis than the age and duration of diabetes. 2. The age of children in the moment of diagnosis the diabetes may influence on abnormalities of growth hormone axis in children with IDDM.

P/022/FRI

Diabetic ketoacidosis in children with newly diagnosed type 1 diabetes mellitus

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Objectives: Despite considerable advances in diabetes diagnosis, diabetic ketoacidosis (DKA) remains still a severe complication associated with significant morbidity and mortality.

The aim of the study was to determine the prevalence and predictors of DKA in children with newly recognized type 1 diabetes mellitus (T1DM).

Methods: The study group consisted of 187 children (95 girls, 92 boys) with the new recognition of T1DM, admitted to our hospital between January 2006 and March 2008, mean age 8.9 ± 4.6 years (0.8–17.8). In all children HbA1c, blood pH and fasting c-peptide were measured. DKA was defined as a capillary pH value of less than 7.3. Statistical analysis was performed by using Unpaired t-test, Mann–Whitney Test, Spearman Rank Correlation, $P < 0.05$ was considered as significant.

Results: DKA was noted in 26% of children with newly recognized diabetes mellitus. Children with DKA were not significantly younger than children without DKA 8.05 vs. 9.15 years $P = 0.15$, but had lower c-peptide level 0.49 vs. 0.65 nmol/l respectively ($P = 0.003$). There was significant correlation between c-peptide and age r = 0.41. $P < 0.0001$. In patients under 2 years DKA occurred in 70% of children. C-peptide was significantly lower in children <2 years vs. >2 years: 0.15 vs. 0.64 nmol/ l respectively ($P < 0.0001$). There was significant difference in pH value between children <2 years and >2 years: 7.21 vs. 7.34 respectively ($P < 0.0002$). In children <2 years HbA1c was significantly lower 10.4% vs.11.3%. $P < 0.03$.

Conclusion: Over one of fourth diabetic children at diagnosis of T1DM have ketoacidosis. The most susceptible to DKA are children younger than 2 years of age, what might reflect a more aggressive beta cell destruction in infants and toddlers.

Poster Session I: Diabetes Acute and Chronic Complications III

P/023/WED

A national, population based study of the double diagnosis of celiac disease and type 1 diabetes in children and adolescents

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Aims: Investigate the relationship between type 1 diabetes and celiac disease and explore the extent of symptoms, treatment and diabetes-related quality of life.

Methods: Two previously validated questionnaires (Canadian Celiac Survey and Diabetes Group Quality of Life) were used. In The Norwegian Childhood Diabetes Quality Register comprising more then 85% of all patients in the country (n = 1810) a standardized examination with centrally measured HbA1c and celiac screening by transglutaminase test is performed annually. 146 patients 0–20 years of age were registered with the double diagnosis, and 82 (56%) responded. Mean age 13 years, 62% were girls. Clinical data were compared to all patients in the register.

Results: The prevalence of celiac disease in children was 8%. 23% had first-degree relatives with type 1 diabetes or celiac disease. 65% had the diagnosis by screening, followed by biopsy. 73% got diabetes first. The most common symptoms at diagnosis were abdominal pain, gas, weakness, problems with blood glucose, mood swings and poor growth. 90% ate strictly glutenfree food. 65% experienced improved health after initiating glutenfree diet. 7% found it hard to follow the diet. Half of the patients felt always/frequently/some times excluded by their peers, two third felt different, embarrased, angry, misunderstood. Nearly half will avoid visiting restaurants, 15% avoid travelling. This is however not significantly different from patients with celiac disease only. The quality of life was generally good and was not significantly different from patients with diabetes only. Frequency of severe hypoglycemia (6 vs. 7%), DKA (5 vs. 5%) and mean HbA1c was not significantly different

between patients with or without celiac disease respectively: HbA1c 8.3 (SD 1.1)% vs 8.5 (SD 1.4)%.
Conclusion: Celiac disease is an additional burden to the patient and their family, but did not significantly impaire patients' general health status compared to patients with diabetes only.

P/024/WED
Screening detected elevated anti tissue transglutaminase antibodies in asymptomatic children with type 1 diabetes – when to biopsy?

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When screening for coeliac disease (CD) in asymptomatic children with type 1 diabetes (T1DM), a marginally elevated serum antibody to tissue transglutaminase (TTG) level is a relatively common finding.
Aims: 1. To establish whether all children with an isolated raised TTG should undergo intestinal biopsy. 2. To compare them to children with histologically proven CD and matched controls.
Methods: All patients with T1DM in a tertiary paediatric centre were screened annually for CD over a 5 year period by determination of Anti-TTG Antibody and IgA anti endomysial antibody (EMA). Each biopsy positive and biopsy negative case was matched for sex, age and duration of diabetes with 2 control subjects. Clinical and laboratory outcomes were measured for 1 year pre and 2 years post Gluten free diet (GFD).
Results: 9/253 (3.5%) children had biopsy confirmed CD. These children had a raised TTG, symptoms of CD and/or were EMA +. In the year pre GFD, cases had similar weight and height gain, HbA1c, Insulin dose and haemoglobin when compared to controls. In the 2 years post GFD, cases demonstrated significant weight gain ($P = 0.03$) but no significant change in height ($P = 0.11$), HbA1c ($P = 0.83$), haemoglobin ($P = 0.22$) or insulin dose ($P = 0.7$) when compared to controls. 9 asymptomatic, screening detected subjects had raised TTG levels (EMA -), with subsequent negative histology on intestinal biopsy. TTG levels in all 9 subjects subsequently spontaneously normalised. All 9 had no significant difference in clinical or laboratory characteristics when compared to controls. A further 40 / 253 (15%) of the clinic population had a raised TTG on at least one occasion which resolved spontaneously.
Conclusion: We suggest that a higher threshold value for TTG is applied when considering intestinal biopsy in asymptomatic children with an isolated, elevated TTG detected on routine screening. This will avoid unnecessary or premature intestinal biopsies.

P/025/WED
Severe subcutaneous insulin infusion resistance in a 13 year old child – a case-report of successfully performed therapy with a diaport^{TM}-system

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Introduction: Extreme subcutaneous insulin infusion resistance (SIR) is rarely reported in pediatrics. It is characterized by severe resistance for subcutaneously applicated insulin while insulin sensitivity for i.v. insulin is normal. Pathophysiology is unclear, an accelerated subcutaneous degradation of insulin is most likely.
Case-report: After 4 years of T1DM without any problems (insulin requirement 0.8 IU/kg/d, treated with CSII, otherwise healthy, no acanthosis nigricans) in a 13 year old girl the insulin requirement suddenly increased massively up to 4.2 IU/kg/d by ongoing hyperglycemia and ketosis. Under i.v. Insulin application the insulin requirement could be reduced to 0.8 Iu/kg/d. No improvement by Biguanids or change of the type of insulin could be achieved. Switching back to s.c. application of insulin was not successful. After 7 weeks inpatient therapy a Diaport^{TM}-System with continuous intraperitoneal insulin infusion (CIPII) was implanted. The daily insulin need by this is 0,6 IU/kg Kg/d.
Diagnostic considerations: There were no clinical or anamnestic signs of PCOS or other relevant syndromes (e.g. Donohue's Syndrom, Rabson-Mendenhall Syndrom, Typ A und B Syndrome, Lipodystrophy-Syndrome Berardinelli-Seip, Barraquer-Simons, Lawrence). Extensive laboratory diagnostics gave no indication for endocrinological or immunological causes.
Discussion: This might be a recurrent form of SIR in a child. Further diagnostic examinations will be necessary in order to find the cause of the problem. CIPII is a cost effective treatment with marked improvement of live quality for a period of time. Intra-abdominal adhesions and infections are the risks which are limiting this therapy.
Conclusion: This was the first treatment of a postpubertal girl in Germany with SIR. In order to solve this therapeutical dilemma we performed an intra-peritoneal insulininfusion by Diaport successfully.

P/026/WED
Modifiable risk factor in type 1 diabetes – adolescence to adulthood: a follow up study

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Aim: Risk factors other than A1C may play important roles in the incidence and progression of microvascular complications in T1D. An adolescent cohort was restudied as young adults to determine putative risk factors during adolescence for microvascular complications in adulthood.
Methods: One hundred fifty-two and young adults (69 M) with T1D screened between 1997–2002 (T1) participated in follow-up in 2007–2008 (T2). Non-participants had higher A1C (8.9 ± 1.4 vs. 8.6 ± 1.5, $P = 0.003$) but no other baseline differences were observed. Retinopathy was assessed by 7-field stereoscopic fundal photography and albumin excretion rate (AER) from 3 timed overnight urine specimens. Multiple regression models were used to evaluate risk factors for complications (age, BP, HbA1c, cholesterol, BMI, duration).
Results: Median age was 15.1 years [IQR 13.5–16.8] at T1 and 23.5 years [21.0–25.6] at T2; Duration of diabetes 7.8 years [4.5–11.0] at T1and 15.4 years [12.5–19.5] at T2. A1C decreased from 8.6 ± 1.4% to 8.04 ± 1.4% ($P < 0.001$), BMI increased from 22.4 to 25.7, ($P < 0.001$). Retinopathy increased from 31 to 53% ($P < 0.001$) and early elevation of AER (>5 ug/min) from 49 to 63% ($P = 0.03$). Males had a higher prevalence of BMI >85% (59% vs. 47%) at T2. Retinopathy at T2 was predicted by Baseline BMI (OR 1.189, 1.065–1.328) and A1C (1.345, 1.027–1.761) at T1. Incidence and progression of retinopathy were predicted by Baseline A1C (OR 1.4; 1.0–1.8) and systolic BP (OR 1.1; 1.0–1.1). An increase in AER at T2 was associated with A1C at T1 (1.19, 1.07–1.32) and T2 (1.16, 1.04–1.29).

Conclusions: Despite improved glycaemic control; rates of retinopathy, early elevation of AER and overweight/obesity increased over 8 years. Adolescent BMI, A1C and BP predicted retinopathy but only A1C predicted an increase in AER in this group. Other therapeutic avenues for metabolic control and risk reduction need to be explored at transition to adult care to delay progression of microvascular disease.

P/027/WED

Nocturnal glycemic pattern and blood pressure nocturnal decline in t1d adolescents

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Objectives: The loss of nocturnal decline of blood pressure has been reported in T1D patients in intensive treatment associated with a nocturnal rise in cathecolamines. Prolonged nocturnal hypoglycemia or wide blood glucose changes during the night were observed in patient during continuous glucose monitoring. Aim of this study is to establish whether the type of blood glucose pattern, with particular reference to severe hypo- or hyperglycemia, during the night could be responsible of impairment of the physiological blood pressure nocturnal decline.

Methods: We studied 12 T1D adolescents (12 boys) 12 to 21-years old (median 18.5) with a disease duration from 50 to 160 months (median 106.5), HbA1c from 6.2 to 9.6 (median 7.95) and insulin requirement from 0.5 to 1.2 (median 0.9). In all patients we simultaneously performed a continous monitoring during 24 hours of glucose (CGMS-Medtronic, Inc.) and blood pressure (TM-2430. A&D instruments). Diurnal and nocturnal HBGI and LBGI were also calculated. The analysis of cathecolamines (free dopamine, free norepinephrine, free epinephrine, total metanephrine, VMA and HVA) was done in urines collected in the same night. Simple regression analysis was used for statistical evaluation.

Results: We did not observe any severe or prolonged hypoglycemic event. The magnitude of the nocturnal decline of systolic and diastolic blood pressure resulted directly correlated to mean nocturnal blood glucose and HBGI ($P < 0.02$). Mean nocturnal blood glucose, HBGI, LBGI and nocturnal blood pressure decline were not correlated to nocturnal urinary cathecolamines. A significant direct correlation was observed between nocturnal blood pressure decline and nocturnal urine volume.

Conclusions: According to our results nocturnal blood pressure decline is more depending on osmotic diuresis than on hypoglycemia induced cathecolamines.

P/028/WED

Serum levels of adiponectin in children and adolescents with type 1 diabetes: impact of pubertal stage, metabolic control and microvascular complications

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Objectives: To determine serum adiponectin level in children and adolescents with type1 diabetes and to study its impact on pubertal stage, metabolic control as well as microvascular complications.

Methods: This was a cross sectional study that included 80 type 1 diabetic children and adolescents (age: 7–17 years with a mean of 13.35 ± 2.83 years).They were compared to 75 non diabetic, age, sex and pubertal stage matched controls. All participants were subjected to history taking, clinical examination. Laboratory investigations included haemoglobinA1c, mean blood glucose, fasting lipid profile and urinary albumin excretion. Adiponectin was measured by enzyme linked immunosorbant assay.

Results: Mean adiponectin levels were significantly higher in diabetic patients compared to controls ($P < 0.0001$).Adiponectin levels were significantly elevated in females compared to male diabetics($P = 0.02$).Serum adiponectin levels did not differ significantly in different pubertal stages. Adiponectin levels were inversely correlated with body mass index standared deviation score (BMI SDS, r = -0.35, $P = 0.024$), weight SDS (r = -0.32, $P = 0.047$), while it was positively correlated with HbA1c (r = 0.81, $P = 0.0001$), urinary albumin excretion (r = 0.61, $P < 0.0001$). There was no any differences in adiponectin concentrations whether or not the patients were taking angiotensin converting enzyme inhibitors. Diabetics with peripheral neuropathy showed significantly higher adiponectin levels compared to patients without neuropathy ($P = 0.005$).

Conclusions: Adiponectin is elevated in children and adolescents with type1 diabetes compared to controls. Higher levels were detected in females, with no impact of puberty. Adiponectin concentrations correlated with glycemic control and microvascular complications (nephropathy and peripheral neuropathy).

P/029/WED

Outcome of metabolic control, complications and associated conditions in our previous pediatric patients after the transition to the adult centre

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Objectives: Few data on follow-up of pediatric patients (pts) after the transition to the adult centre are available. We collected data of 69/94 of our previous pts living in Bologna area with onset between 1972 and 1992 and transferred to the local adult centre. M/F ratio was 32/37, age at onset 8.4 ± 3.8 years, at transition 23.8 ± 3.9 years, present 34.1 ± 4.6 years, disease duration 25.9 ± 5.1 years (15.9 ± 5.5 years at our centre and 8.4 ± 6.1 at adult centre).

Methods: Data on metabolic control (current and mean of all), retinopathy, nephropathy, other associated conditions or psychosocial aspects were collected.

Results: Current HbA1c was 8.1 ± 1.5%, similar to the value at transition (8.3 ± 1.4%). In 40% of cases HbA1c improved of at least 0.5%, in 53% worsened of at least 0.5%.

The pts without retinopathy had a mean of all HbA1c values significantly lower ($P = 0.004$) despite a longer disease duration ($P = 0.0001$). The same was true for nephropathy. 2 pts were blind. The first 3 associated conditions included thyroiditis

(18.8%), depression (13%) and ovarian cysts (10.8%). 17/69 of pts (24.6%) had suffered at least once of significant psychosocial disturbances: depression, panic attacks, eating disorders and drug or alcohol abuse, more frequent in the pts with onset at puberty (7/18; 39%).

Complications	HbA1c (%)	Disease duration (years)	% of patients
No retinopathy	7.9	24	49.7
Non proliferative retinopathy	8.6	20	36.2
Proliferative retinopathy/blindness	9.9	16	14.1
No nephropathy	8.1	26	81.1
Micro/macroalbuminuria	9.3	19	13.2
Renal disease	9.5	17	5.7

Conclusions: Metabolic control of our previous patients showed minor variations after a mean period of 8 years after transition to the adult centre. 20% of the patients showed severe retinopathy associated with persistently poor metabolic control. Severe psychological and psychosocial problems were unexpectedly frequent in our group of adult patients.

P/030/WED

Plasma adrenomedullin level in Egyptian children and adolescents with type 1 diabetes mellitus: relationship to microvascular complications

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Background: Adrenomedullin (AM) is known to be elevated in different clinical situations including diabetes mellitus (DM), but its potential role in the pathogenesis of vascular complications in diabetic children and adolescents is to be clarified.

Objectives: The study aimed at assessment of plasma adrenomedullin levels in children and adolescents with type 1 DM and correlation of these levels with metabolic control and diabetic microvascular complications

Methods: The study was performed in the Diabetes Specialized Clinic, Children's Hospital of Ain Shams University, Cairo, Egypt. The study included 35 diabetic children and adolescents (mean age 14.3 years). They were subdivided into 20 with no microvascular complications (MCV) and 15 with MCV patients. Thirty healthy subjects, age-and sex- matched were included as control group (mean age 11.46 years).Patients and controls were assessed for glycated hemoglobin (HbA_{1c}), urinary micro-albumin, and plasma adrenomedullin assay using ELISA technique.

Results: Mean plasma AM levels were significantly increased in diabetic patients with & without MCV compared to control group, (110.6 pg/ml, 60.25 pg/ml. 39.2 pg/ml respectively) ($P < 0.01$) and in those with complications compared to diabetics without ($P < 0.05$).Plasma AM levels were positively correlated with both duration of diabetes ($r = 0.498$, $P < 0.05$) and glycemic control (HbA_{1c}) ($r = 0.04$, $P < 0.05$).

Conclusion: Higher plasma AM levels in diabetics with MCV & its correlation with diabetes duration and metabolic control may indicate the role of AM in diabetic vasculopathy.

P/031/WED

Folic acid, vitamin B12 and homocysteine levels fasting and after methionine load in patients with type 1 diabetes mellitus

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Objectives: To assess plasma concentrations of folic acid, vitamin B12 and total plasma homocysteine (tHCY) during fasting and after methionine load in young patients with type 1 diabetes mellitus (T1DM).

Methods: We enrolled 41 young patients with T1DM without any sign of microvascular complications and 123 healthy controls in a 1:3 cross-sectional case control study. Fasting and postmethionine load (PML) tHCY, folic acid and vitamin B12 levels were measured in both groups. Data regarding chronological age, metabolic control (assessed by mean values of Hemoglobin A1c in the last 12 months) and disease duration were also recorded.

Results: Fasting and PML tHCY levels were significantly lower in patients than in controls: 7.3 ± 2.7 μmol/l vs. 8.3 ± 2.5 μmol/l ($P = 0.01$), and 16.7 ± 5.8 μmol/l vs. 17.3 ± 4.3 μmol/l ($P = 0.01$), respectively. No correlation was found between fasting and PML tHCY levels and chronological age, disease duration, metabolic control, and insulin requirement. Patients had significantly higher vitamin B12 levels compared to controls: 767 ± 318 vs. 628 ± 236 pg/ml ($P = 0.003$), while folic acid turned out to be lower in patients than in controls: 5.3 ± 1.9 vs. 7.5 ± 2.6 nmol/l ($P < 0.0001$).

Conclusions: Adolescents and young adults with T1DM without microvascular complications showed lower tHCY both during fasting and after methionine load. Lower folate concentrations in these patients might benefit from food fortification.

P/032/WED

Risk factors for microalbuminuria in adolescents with type 1 diabetes

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Objectives: Microalbuminuria is the most serious predictive sign of nephropathy. The aim of our cross section study is to determine the frequency of microalbuminuria in adolescents with type 1 diabetes mellitus after a period of remission of the disease and determine the relation between microalbuminuria and other risk factors for the development of diabetic nephropathy: HbA1c, blood pressure (BP), insulin doses, BMI, diabetes duration.

Methods: The existence of microalbuminuria was examined in a cross section study of 60 adolescents of the mean age of 15.3 ± 2.4 (11.0–19.7) years with type 1 diabetes mellitus of the mean duration of 7.7 ± 3.4 (3.5–17.0). Microalbuminuria was determined in 2–3 samples of the first morning urine in the period below 6 months, using turbidimetric method, in which the normal value was below 15 mg/l. Ambulatory blood pressure was monitored (SpaceLabs 90207).

Results: Of all our patients, microalbuminuria developed in 13.3% of adolescents with completed sexual development, statistically significantly poorer metabolic control (9.79% vs. 8.7%) and higher BMI ($23.59\ kg/m^2$ vs. $20.85\ kg/m^2$) than in the patients with normoalbuminuria ($P < 0.05$). The mean value of night-time systolic blood pressure was statistically significantly higher in patients with microalbuminuria than in those with

normoalbuminuria (113.62 ± 10.98 vs. 106.77 ± 7.93, $P < 0.05$), whereas for the other mean values of blood pressure we did not find a statistically significant .The duration of diabetes and insulin doses are in statistically significant correlation with systolic night-time blood pressure ($P = 0.313$, $P = 0.01$; $P = 0.269$, $P = 0.03$) and diastolic night-time blood pressure ($P = 0.301$, $P = 0.02$; $P = 0.331$, $P = 0.01$).

Conclusions: These adolescents require attention in order to minimize associated factors of high HbA1c, elevated BMI and night-time SBP in the development of incipient nephropathy.

P/033/WED

Antioxidant factors and endothelial function in children and adolescents with type 1 diabetes mellitus

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Chronic hyperglycemia increases production of free radical intermediates which in turn augments oxidative stress. The oxidative stress can play a key role in diabetic complications affecting also vascular function.

We evaluated lipid levels, antioxidant factors and parameters related to oxidative stress, and endothelial function to assess the relationships between these parameters and metabolic control in children and adolescents with T1DM. A total of 58 T1DM patient (11.5 ± 3.49 year) and 36 healthy children (9.60 ± 3.21 years) were studied.

In all children total cholesterol (TC), low-density lipoprotein-cholesterol (LDL-C), high-density lipoprotein-cholesterol (HDL-C), triglycerides (TG), Lipoprotein (a) [Lp(a)], homocysteine, fibrinogen, MDA, Vitamin E (VitE), beta-carotene, lycopene, retinol, Vitamin C reduced (Vit C-Red) and oxidized (VitC-Oxid) and hemoglobin glycosilated (^{HbA1c}) were measured. Vascular function was assessed by measurement of endothelium-dependent vasodilatation of brachial artery (FMD) using an ultrasound system. There was no significant difference in TC, LDL-C and HDL-C between diabetic patients and controls, while TG in T1DM subjects were significantly lower than in control ones. Total antioxidant status (VitE, beta-carotene, lycopene, retinol, Vit C-Red) don't showed significant difference between groups. Only levels of VitC-Oxid were significant higher in patiens with T1DM. Moreover, prepuberal T1DM subjects showed higher MDA concentration than controls ($P < 0.01$). FMD (7.99 ± 1.06%) was impaired in 46% of T1DM subjects. There was a negative correlation between FMD and LDL-C. Diabetic patients showed increased oxidative parameters (MDA, VitC-Oxid). Even if FMD was not apparently related to antioxidant status, the relationship with lipid values emphasizes the role of a global metabolic control to optimize the vascular health of these patients.

Poster Session II: Diabetes Acute and Chronic Complications IV

P/034/FRI

Cardiac mass and function and carotid artery intima-media thickness in children with type 1 diabetes

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Background: Individuals with type 1 diabetes have a two- to fourfold increased risk of developing atherosclerotic diseases.

Aim: To evaluate carotid intima- media thickness, cardiac mass and function in children with type 1 diabetes.

Subjects and methods: Sixty-five children with type 1 diabetes and 30 healthy control age and sex matched children were included. Their mean age was (11.56 ± 4.03) and (11.66 ± 3.17) respectively. The mean duration of diabetes was (2.6 ± 1.4) years and mean HbA1c was (8.9 ± 1.8%).

Results: None of the children had hypercholesterolemia. Blood pressure (BP) measurement, Lipids profile and glycosylated hemoglobin (HbA_1c) was assayed. Carotid artery intima-media thickness (cIMT) was measured using High-resolution ultrasound. Evaluate of function was performed. Cardiac mass was calculated using the Devereux formula. Carotid IMT was significantly higher in children with diabetes than control (0.44 ± 0.08 vs. 0.41 ± 0.02 mm) (P 0.001). The mean cIMT was positively correlated with patient's age, diabetes duration, BMI, BP, LDL cholesterol and HbA1c. High density lipoprotein cholesterol (HDL) was negatively correlated with cIMT. In a multivariate analysis, duration of diabetes (P 0.000), BMI (P 0.001), lower HDL cholesterol (P 0.003) and HbA_1c (P 0.000) were an independent risk factors for increased carotid IMT in diabetic children. No significant difference was found between both groups as regards cardiac mass, systolic and diastolic functions.

Conclusion: Although there was no alteration in cardiac mass and function in diabetic children in the first few years after diagnosis, type 1 diabetes can be considered a risk factor for early atherosclerotic vascular changes in those children.

P/035/FRI

Role of blink reflex in detection of subclinical cranial neuropathy in type 1 diabetic patients with peripheral neuropathy

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Objectives: The aim of this study was to evaluate the usefulness of electrophysiological assessment by blink reflex (BR) for early diagnosis of cranial neuropathy in type I diabetic patients presenting with peripheral neuropathy.

Methods: The study included 58 children and adolescents with type I diabetes mellitus and peripheral neuropathy (mean age: 14.53 ± 2.51 years). They were chosen from those attending the Pediatric Diabetes Clinic, Children's Hospital, Ain Shams University and sixty healthy matched controls. All were subjected to complete history taking and physical examination, with special emphasis on neurological examination. Laboratory investigations included; random blood glucose, glycated hemoglobin (HbA1c), as well as quantitative determination of urinary microalbumin. Nerve conduction studies of median and tibial nerves, and BR were carried out for all participants.

Results: All diabetic patients showed significantly abnormal electrophysiological parameters of nerve conduction studies, as well as BR. Although significant correlation has been found between nerve conduction and degree of glycemic control and microalbuminuria, no significant correlation was detected between these laboratory parameters and abnormalities of BR. Blink reflex abnormalities have been observed to be more associated with median nerve conduction delay, especially the late component R2 contralateral ($P < 0.001$).

Conclusions: Blink reflex is a simple and non invasive test that can give an early idea about cranial nerve affection in type 1 diabetic

patients with peripheral neuropathy. Patients with motor conduction abnormalities (especially of the median nerve) have a higher chance of demonstrating abnormal blink reflex response than those without such conduction abnormalities.

P/036/FRI

Somatic development and follow-up of children with type-1 diabetes mellitus and biopsy confirmed celiac disease in a multicenter survey from Germany and Austria

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Objectives: Children and adolescents with type 1-diabetes mellitus (T1DM) are at increased risk for developing celiac disease (CD). The aim of this longitudinal study was to evaluate the influence of biopsy confirmed CD on somatic development and metabolic parameters in T1DM children in a multicenter survey.

Methods: The DPV-Wiss-Project consists of anonymous data taken from patients with diabetes. Data from 41 911 patients with T1DM and <20 years of age (52% males, mean age 13.9 years; mean duration of diabetes 5.5 years) were collected in 297 centres in Germany and Austria from 1991 to March 2009 and available for analysis. The most recent year of observation was evaluated.

Results: 406 patients (0.9%; 58% females) out of 41 911 patients were diagnosed with biopsy confirmed CD. In comparison to non-CD patients, patients with CD were significantly younger at diabetes onset (5.9 vs. 8.4 years), had a significantly lower weight SDS (0.19 vs. 0.41) and height SDS (-0.28 vs.-0.05) ($P < 0.001$). In contrast no differences were found in BMI SDS, HbA1c or numbers of severe hypoglycaemic episodes. Screening frequency for CD (17% of patients in 1998; 68% of patients in 2008) and the number of biopsies in CD antibody positive patients (4% in 1998; 8% in 2008) have increased over time. In a 3-year follow-up of a subgroup of 15 696 patients (233 of them with biopsy confirmed CD) significantly lower height SDS (-0.1 vs. 0.1) and weight SDS (0.2 vs. 0.4) were found again in patients with CD ($P < 0.001$). There were still no differences in BMI SDS and HbA1c.

Conclusion: In this multicenter analysis 406 T1DM children (0.9%) were diagnosed with biopsy confirmed CD. Patients with CD have lower anthropometric parameters such as height and weight SDS, which was still present after a 3-year follow-up. In contrast no differences in metabolic parameters such as HbA1c and frequency of severe hypoglycaemia have been found.

P/037/FRI

Impaired diffusing capacity for carbon monoxide in children and adolescents with type 1 diabetes (T1DM): is this the first sign of long-term complications?

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Objectives: To assess the presence of lung dysfunction in adolescents with T1DM, and if the alteration of the pulmonary capacity depends more on the reduction of the diffusing capacity of the alveolar-capillary membrane (A-CM) or of the pulmonary capillary (PC) blood volume.

Methods: We evaluated 42 consecutive young patients (23 males), ages 15 ± 3 years, with T1DM for 8 ± 5 years (height 164 ± 12 cm, weight 59 ± 15 kg). As controls we evaluated 30 healthy age and sex-matched peers. Both patients and controls were non smokers and didn't report any lung disease. Lung volumes and spirometric dynamic parameters were assessed by plethysmography. Single-breath DLCO was measured. Double measurements were accepted when estimates of DLCO and effective alveolar volume differ by 5%. The interval between measurements was 5 minutes and the tests were performed in the standing position. The CO transfer coefficient (KCO) was derived. The diffusing capacity of the A-CM and the PC blood volume were calculated using the Roughton and Foster equation.

Results:

Table 1 Respiratory function values in TIDM patients and controls

	Patients with T1DM (n = 42)	Controls (n = 30)	Significance
FVC (%predicted)	101 ± 14	120 ± 5	0.0001
FEV1 (% predicted)	95 ± 13	114 ± 7	0.0001
TLCO (% predicted)	107 ± 14	115 ± 13	0.05
RV/TLCO (% predicted)	107 ± 24	99 ± 12	NS
DLCO (% predicted)	78 ± 16	120 ± 1	0.0001
KCO (% predicted)	86 ± 15	115 ± 12	0.0001
DM (ml/mim/mmHg)	23 ± 14	26 ± 3	NS
Vc (ml)	34 ± 20	88 ± 18	0.0001

NS, not significant.

Conclusion: Lung volumes, the transfer factor (TLCO), KCO and the pulmonary capillary blood volume (Vc) were significantly reduced in young patients with T1DM when compared to controls. However, when differentiating the A-CM component and the PC blood volume component, we observed a significant impairment only about PC blood volume component. If this might be seen as the 'first' sign of microangiopathic involvement in patients with T1DM have to be confirmed on larger groups but is still fascinating.

P/038/FRI

Prospective cross-sectional study on the frequency of parietal cell antibodies in children and adolescents with type 1 diabetes mellitus compared to healthy controls

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Objective: Studies in adults have shown a higher prevalence of parietal cell antibodies (PCA, up to 20%) in patient with type 1 diabetes mellitus (T1DM) compared to healthy controls (1%). PCA are the principal markers of autoimmune gastritis (AG), leading to pernicious anaemia and iron deficiency. The aim of this study was to evaluate the frequency of PCA in children and adolescents with T1DM compared to healthy controls and to evaluate clinical findings in PCA positive patients with T1DM.

Methods: We studied 170 patients (87 male) with T1DM (mean age 12.9 years, mean duration of diabetes 4.9 years) and 101 healthy controls (49 male), mean age 13.0 years. PCA, free T4, free T3, TSH, TPOAb and TgAb were measured in all patients. Gastrin,

pepsiongen I, iron, ferritin, vitamin B12 and folate were measured in T1DM patients only. Gastroscopies with multiple biopsies and Helicobacter tests were carried out in T1DM patients with high (>100 U/ml) PCA.

Results: The occurence of PCA in patients with T1DM was 5.3% compared to 1.9% in healthy controls. We found a strong correlation between PCA and TPOAb as well as PCA and gastrin ($P = 0.001$). Age, sex, diabetes duration and age at diabetes onset could not be identified as risk factors for developing PCA. Hypochromic microcytic anaemia was present in 4 out of 9 patients from the PCA+ group compared to 4 out of 160 patients from the PCA- group (ns). Hypergastrinemia was found in 2 patients from the PCA+ group compared to none out of the PCA- group. None of the patients had low pepsinogen I levels. Out of 4 patients, who underwent gastroscopy, one girl had early signs of AG.

Conclusion: Compared to healthy controls, children and adolescents with T1DM are at increased risk for developing PCA, in particular if positive for TPOAb. Young T1DM patients with positive PCA have early signs of AG, as iron deficiency anaemia and hypergastrinemia. We therefore recommend screening for PCA at diabetes onset and later on in the adolescent years.

P/039/FRI

Endothelial dysfunction, increased carotid intima-media thickness and blood pressure are early preclinical vascular abnormalities in young subjects with type 1 diabetes mellitus and satisfactory glycemic control

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Objectives: This study was designed to investigate early cardiovascular involvement in adolescents and young adults with childhood-onset T1DM free of comorbidities and overt vascular complications.

Methods: Thirty T1DM normotensive patients (age = 19 ± 3, BMI = 22 ± 3, disease duration = 10.7 ± 5.4, HbA1c = 7.7 ± 1.1%) without micro- and macrovascular complications, and 38 controls (C) of comparable age and BMI (age = 20 ± 2, BMI = 22 ± 3) were studied. LV geometry and function were evaluated by Doppler echocardiography. Intima-media thickness (IMT) of common carotid artery (CCA) was assessed by a radiofrequency based technique (Q-IMT, Esaote, Genova), while indices of arterial wave reflection (Augmentation index, AIx) and local CCA stiffness (Peterson elastic modulus, EP, and pressure-independent index β) were obtained by high resolution US providing arterial diameter and distension curves (Aloka Alpha10, Tokyo). Carotid-femoral pulse wave velocity (PWV, Complior, Paris) was measured as an index of aortic stiffness. Endothelial function was assessed as reactive hyperemia index (RHI) by peripheral artery tonometry (PAT) (Endo-PAT, Cesarea, Israel) and by circulating endothelial progenitor cells (EPCs).

Results: Compared to C, T1DM had higher systolic BP (121 ± 11 vs. 111 ± 10 mmHg), Q-IMT, PWV, AIx and EP ($P < 0.03$), without differences in β. EPCs were significantly reduced in patients vs. C ($P < 0.003$), while RHI was lower in patients with HbA1c >7.5% ($P < 0.004$), and correlated inversely with diastolic BP in the entire T1DM group. No differences in LV geometry and function were observed between patients and C.

Conclusions: Our data indicate that T1DM subjects with a disease duration as longer as 10 years and a satisfactory glycemic control show preclinical vascular involvement represented by endothelial dysfunction, increased arterial wave reflection and Q-IMT, and mildly elevated BP. Pressure-independent large artery stiffness as well as LV geoemtry and function appear still unaffected.

P/040/FRI

The prevalence of peripheral sensation abnormalities in children and adolescents with type 1 diabetes (T1DM)

M. Louraki[1], K. Karavanaki[1], M. Katsalouli[2], E. Tsouvalas[1], P. Karanika[1], A. Papathanasiou[3] & C. Karayianni[1], 38 children and adolescents with diabetes and 24 healthy age- and sex-matched controls

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Peripheral diabetic neuropathy (PDN) is a common complication in adults with T1DM, whereas relative symptoms have not been reported in children and adolescents.

Objectives: To study the prevalence of impaired vibration sensation thresholds (VSTs) in children with T1DM, as an early index of PDN. We studied 38 children and adolescents with T1DM, with a mean (±SD) age of 14.3 ± 3.8 years and diabetes duration of 6.2 ± 4.2 years, and also 24 age and sex-matched controls, aged 13.5 ± 1.9 years.

Methods: VST was measured using a biothesiometer (Biomedical Instrument, Ohio, USA) in the thumb, index finger, toe and hallux, of the patients and controls. The growth and pubertal status were recorded and metabolic control was assessed using HbA_{1c}.

Results: Children with T1DM had significantly higher VSTs compared to the controls (index finger: 3.98 vs. 2.38 μm/sec, $P = 0.001$, thumb: 4.05 vs. 2.53 μm/sec, $P = 0.001$, toe: 3.16 vs. 2.19 μm/sec, $P = 0.001$, hallux: 5.92 vs. 4.33 μm/sec, $P = 0.001$). Dividing the patients into two subgroups according to the HbA_{1c} levels, the group with $HbA_{1c} > 8.0\%$ had higher VPTs compared with the group with $HbA_{1c} < 8.0\%$ (3.62 vs. 2.83 μm/sec, $P = 0.042$).18/38 children with T1DM (47.36%) (13 boys, 5 girls) had abnormal VPTs in >/1sites, whereas 5/38 (13.15%) in all sites measured. These children were not different in age, diabetes duration, height and HbA_{1c} levels from the rest of the patients.

Conclusions: In the children and adolescents with T1DM of our study impaired indices of peripheral sensation were recorded. These findings suggest that possibly, in the early stages of the disease, appear early signs of subclinical PDN, which need a regular follow-up.

P/041/FRI

Kidney size is dependent of metabolic control in children and adolescents with type 1 diabetes

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Background: Kidney size is increased at the diagnosis of type 1 diabetes in children and adolescents and can be reversed by restoration of glycemic control. Renal hypertrophy has been linked to GH hypersecretion, which occurs during poor metabolic control and precedes in general the occurrence of microalbuminuria.

Aim: To look for disease duration, HbA1c and IGF-1 as determinants for renal hypertrophy in normo-albuminuric type 1 diabetic children and adolescents.

Study population: 154 children and young adults with type 1 diabetes, aged between 2 and 25 years, followed at the University Hospital Ghent, with a disease duration at least 6 months and without microalbuminuria were selected.
Methods: Renal volume was measured by ultrasound as described by Dinkel E et al and was corrected to 1.73 m^2 body surface. IGF-1 was measured by Immulite assay and results expressed as age related Z-scores. Hba1c was determined by a commercial HPLC.
Results: Mean diabetes duration was 5.5 years (range 0.9–24 years). Mean HbA1c was 7.9% (range 5.5–14.1). Mean IGF-1 Z-score was -0.59 (range -2.4–2.2). Mean renal volume was 231 ml/ 1.73 m^2 (range 136 to 330 ml/ 1.73 m^2). Eight of the patients had nephromegaly (>300 ml/1.73 m^2). Renal volume was weakly correlated with HbA1c ($r = 0.19$; $P < 0.05$). No correlation was found between renal volume and age of the patients, duration of diabetes or absolute or adjusted IGF-1 values.
Conclusion: Kidney size in type 1 diabetes is correlated with metabolic control during the first 20 years of the disease. The low prevalence of nephromegaly (5%) might be attributed to the absent microalbuminuria and the better glycemic control in comparison with earlier surveys. Further follow up will indicate whether renal volume is a marker for subsequent nephropathy.

P/042/FRI
Trace elements, magnesium and the efficacy of antioxidant systems in adolescent patients with type 1 diabetes mellitus and in their siblings

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The aim of the study was to evaluate the levels of Mg, Se, Zn, Mn and Cu and the effectiveness of antioxidant defence mechanisms (SOD, GSHPx, CAT, TAS) in pts with DM1 in the pubertal period. The investigated parameters were also evaluated in the siblings of DM1 pts and in the control group.
Material and methods: Eighty seven children with DM1 aged x 13 years, who had been treated for DM1 for an average of 3.5 years. The siblings group comprised 27 children and the control group - 41 children.
Results: Plasma levels of Mg and Zn in DM1 pts were significantly lower in comparison to the control group ($P = 0.0009$ and $P = 0.046$). The level of Zn was significantly lower in the group of siblings in comparison to the control group ($P = 0.040$), and the level of Cu in DM1 children was significantly higher in comparison to controls and siblings ($P = 0.0003$ and $P = 0.0007$ respectively). The activity of CuZnSOD in DM1 pts was significantly lower in comparison to controls ($P < 0.0001$). No significant difference was observed in the level of SeGSH-Px in the study groups. The activity of CAT was significantly higher in diabetic children and in their siblings in comparison to controls ($P < 0.0001$ vs. $P = 0.0006$). The level of TAS was significantly lower in diabetic patients and in their siblings in comparison to control subjects ($P < 0.0001$ vs. $P < 0.0001$).
Conclusions: Mg and Zn deficiency and increased level of Cu in children with DM1 may be associated with impaired antioxidant status. The oxidative stress in DM1 patients is accompanied by alterations in enzymatic activity as well as non-enzymatic mechanisms of antioxidant defence. Decreased total antioxidant status in patients with DM1 may evidence impaired effectiveness of non-enzymatic antioxidant system. Increased activity of CAT and unimpaired activity of Se-GSHPx point indirectly to an enhanced generation of ROS in DM1 children. Impaired mechanisms of antioxidant defence in the siblings of DM1 patients may indicate the role of genetic factors.

P/043/FRI
Transforming growth factor-beta-1 in children and adolescents with type 1 diabetes in relation to diabetic nephropathy

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Objective: We evaluate serum Transforming Growth Factor Beta 1(TGFB1) in children and adolescents with and without diabetic nephropathy and correlates the level with different biochemical parameters.
Methods: The present study included 60 children and adolescent with type 1 diabetes divided into two groups, group 1: composed of 30 diabetic patients with variable degree of nephropathy. This group contains subgroup 1a, 15 patients with overt nephropathy and subgroup 1b, 15 patients with microalbuminuria (<300 ug/ mg). Group 2: composed of 30 diabetic patients without nephropathy (positive controls) and group 3 composed of 30 age and sex matched healthy children and adolescents (negative controls). Mean value of random blood glucose readingsand mean value of HbA1c over the last year follow up, blood cholesterol, serum creatinine, serum TGFB1 and urinary albumin excretion were done for all studied groups.
Results: In our study biochemical results revealed that TGFB1 is significantly higher in diabetic patients than controls, moreover it is significantly higher in patients with nephropathy when compared to those without nephropathy (29.13 ± 2.93, 23.01 ± 2.53, $P < 0001$). Among those with nephropathy,TGFB1 was found to be significantly higher in patients with overt nephropathy than patients with microalbuminuria (31.22 ± 2.63, 27.05 ± 1.27, $P < 0001$)and in patients with disease duration more than 10 years than those with disease duration 5–10 years(31.06 ± 3.76, 28.43 ± 2.31, $P < 0.05$), moreover there is + ve significant correlation found between TGFB1 and mean value of random blood glucse, mean value of HbA1c, blood cholesterol, serum creatinine, and urinary albumin excretion in those with diabetic nephropathy.
Conclusion: Our results revealed that TGFB1 may play a critical role in the process of glomerular inflammation. Accordingly, it may be also directly implicated in the functional deterioration of the kidney functions seen in patients with diabetic nephropathy.

P/044/FRI
Serum angiogenin levels in type 1 diabetic children and adolescents: relation to microvascular complications

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Background: Angiogenin is one of the most potent inducers of vascular growth. It is useful to measure its level for better understanding of development of microangiopathy in diabetes.
Objectives: To study serum level of angiogenin in type 1 diabetic children and adolescents and to correlate it with diabetic microvascular complications and degree of glycemic control.
Methods: Fourty-nine type 1 diabetic children and adolescents (31 with microvascular complications (MCV) and 18 without MCV) were recruited from the Diabetes Clinic, Children's Hospital, Ain Shams University. Twenty age and sex matched children and adolescents served as control group. Diabetic patients with MCV were subdivided into: retinopathy (n = 9), neuropathy (n = 9), and nephropathy groups (n = 13). All patients were subjected to

clinical examination, measurement of mean glycated hemoglobin (HbA1C), urinary microalbumin assay and serum angiogenin levels.
Results: Angiogenin levels were significantly higher in diabetic patients (314.57 ± 68.57 ng/ml) compared to controls (211.65 ± 19.99 ng/ml) ($P < 0.001$). Diabetic patients with MCV showed significantly higher angiogenin levels compared to those without (353.32 ± 53.4 ng/ml vs. 274.83 ± 28.11 ng/ml) ($P < 0.001$). Retinopathy group showed the highest angiogenin levels among the complicated groups. Patients with microalbuminuria showed significantly higher angiogenin levels compared to normoalbuminuric patients (375 ± 13.88 ng/ml vs. 292.75 ± 67.35 ng/ml) ($P < 0.001$). Angiogenin levels were significantly higher in pubertal compared to prepubertal patients (327.8 ± 66.46 ng/ml vs. 263 ± 52.12 ng/ml) ($P < 0.001$). Significant positive correlation was shown between serum angiogenin levels and mean HbA1C in all patients($r = 0.58$), complicated ($r = 0.42$) and uncomplicated diabetic patients ($r = 0.78$).
Conclusion: Raised serum angiogenin levels do occur in diabetic children and adolescents. The development of microvascular complications are associated with markedly increased serum angiogenin levels.

Poster Session I: Diabetes and Obesity I

P/045/WED
Adiponectin kinetics in response to complex stimulus of insulin injection and food intake in children with type 1 diabetes mellitus

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Objectives: One of the major factors regulating adipose tissue function is insulin. On the other hand, adipocytes secrete adipocytokines, that may influence insulin synthesis and action. Adiponectin influence glucose homeostasis increasing insulin-sensitivity. In patients with type 1 diabetes mellitus (t1DM) physiological adipo-insular axis is replaced with exogenous insulin-therapy, so arises question of differences in adipose tissue function in these patients. Aim of the study was to establish the kinetics of adiponectin concetrations in relation to insulin-glycaemic balance, based on response to complex stimulus of insulin injection and food intake in patients with t1DM, compared to simple stimulus of food intake in healthy controls.
Methods: The study comprised of 25 children with t1DM, aged 7 to 17.5 years, of disease duration 1.5 to 10 years. Control group comprised of 17 children, aged 6.5 to 18 years. Blood samples for adiponectin (RIA), insulin and glukose were in 4 time points taken: fasting (0min), and 60, 120 and 180 minutes. after insulin injection and breakfast in children with t1DM, and only breakfast in healthy controls.
Results: Mean concetrations of adiponectin in patients with t1DM were 0' 12.68 ± 7.93; 60' 10.24 ± 6.92; 120' 11.30 ± 8.84; 180' 10.96 ± 6.38 μg/ml; while in control group: 0' 8.75 ± 6.20; 60' 8.51 ± 6.13; 120' 9.89 ± 8.33; 180' 9.39 ± 9.00 μg/ml. The only statistically relevant difference was found in diabetic patients - the decline between 0' and 60' time points; although, the groups were not significantly different, despite observed differences in insulinemia and glycemia.
Conclusions: The insulin-glycaemic balance does not influence adiponectin kinetics in response to both: complex stimulus of insulin injection and food intake in patients with t1DM, as well as to simple stimulus of food intake in healthy controls. T1DM reveals differences in adiponectinaemia, which is not observed in healthy individuals.

P/046/WED
Effects of different types of exercise on insulin resistance in overweight youth: a randomized controlled trial

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Objective: We examined the effects of aerobic versus resistance exercise training on *in vivo* insulin sensitivity and secretion in overweight youth.
Methods: 18 pubertal overweight (BMI ≥95th) boys [BMI (±SD): 34.6 ± 3.2 kg/m^2, age: 14.7 ± 1.6 years] were randomly assigned to one of the following three groups for 3 months: resistance exercise (RE, n = 8), aerobic exercise (AE, n = 6), or a non-exercise control group (n = 4). Changes in insulin sensitivity and secretion were evaluated by a 3-hour hyperinsulinemic-euglycemic and a 2-hour hyperglycemic (12.5 mmol/l) clamp tests, and abdominal fat by magnetic resonance imaging. Cardiorespiratory fitness (CRF) was measured using a graded maximal treadmill test.
Results: Compared with the control group (4.5 kg), no changes ($P > 0.1$) in body weight were observed in the RE (0.1 kg) and AE (1.2 kg) groups. CRF significantly ($P < 0.5$) improved within the exercise groups [23.1% (RE) and 36% (AE)] compared with controls. Reductions in percent body fat (-2.3%, $P < 0.05$) and abdominal subcutaneous (-31.3 cm^2, $P < 0.05$) and visceral fat (-21.8 cm^2, $P < 0.05$), and increases in fat free mass (2.8 kg, $P < 0.05$) were observed in the RE group, but not in the AE and control groups. Significant ($P < 0.05$) improvements in insulin-stimulated glucose disposal (27.4%) and glucose-stimulated insulin secretion (33.3%) were observed in the RE group alone (Figure 1).
Conclusions: Our preliminary data suggest that regular exercise in the absences of weight loss or calorie restriction is beneficial to improve CRF in previously sedentary, overweight boys. Moreover, resistance exercise is associated with significant reductions in total and abdominal fat, and improvement in insulin resistance. These findings suggest that adoption of a physically active lifestyle should be a cornerstone in the treatment and prevention of childhood obesity and related co-morbidities in youth.

P/047/WED
Influence of elevated fat tissue content on the incidence of particular components of metabolic syndrome in Polish obese children

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Recently, an increasing incidence of obesity and its complications has been observed in children. The goal of the study was an evaluation of the incidence of particular components of metabolic syndrome (MS) in obese children vs. fat tissue content (FAT%).

Material & methods: Sixty seven children (25 boys), age 11.4 ±2.7 years with simple obesity were qualified into the study. In each child height, weight and waist circumference, blood pressure and body mass composition by bioimpedance method were determined. Lipids profile was measured in fasting condition. Glucose and insulin concentrations were assessed during oral glucose tolerance test (OGTT). Following the obtained results, BMI and the waist/height ratio (WHtR) were calculated, as well as the insulin resistance indices (IRI) by HOMA and Belfiore's methods.
Fasting HDL-cholesterol, triglyceride (TG) and glucose concentrations were regarded to be elevated, following the criteria for MS diagnosis in children, as proposed by Ferranti 2004.
Results: Hypertension was found in 34.2% children, abdominal obesity in 37%. Positive correlation was demonstrated between FAT% and WHtR. Abnormal lipids concentrations were found in 50% children, including elevated TG in 32.8% children and lowered HDL in 32.8% ones. Negative correlation was found between FAT% and HDL concentration. Neither increased fasting glucose nor abnormal glucose tolerance was observed in any of the children. Insulin resistance was found in 13% children, based on the IRI_{HOMA} and in 67% children acc. to $IRI_{Belfiore}$. Significant, positive correlation was found between FAT% and fasting insulin concentration, as well as between FAT% and insulin concentration after one hour of OGTT and between FAT% and IRI. In total, in 62.7% of the examined children, at least, two components of the MS were observed.
Conclusions: Elevated fat tissue content in child's organism is a risk factor of metabolic syndrome occurrence.

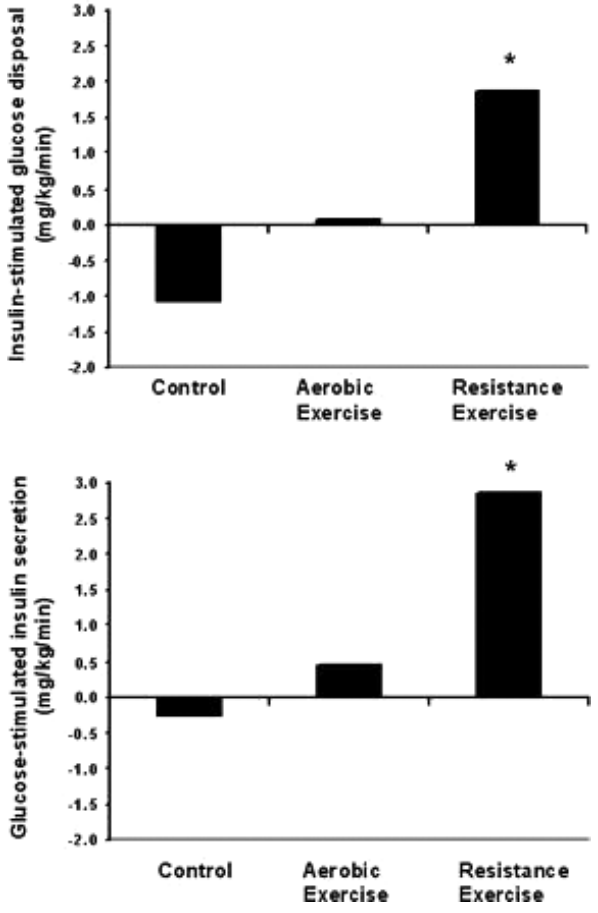

Figure 1. Improvements in insulin sensitivity and secretion for each intervention group.

P/048/WED

Prevalence of impaired glucose tolerance and type 2 diabetes in obese children and adolescents in Slovenia

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Objective: The number of obese children is increasing rapidly and so is the prevalence of impaired glucose tolerance and type 2 diabetes. The prevalence of childhood obesity in Slovenia is as high as in western European countries. We determined the prevalence of impaired glucose tolerance and type 2 diabetes in a cohort of 411 Slovene obese (BMI SDS >2) children and adolescents (2 to 22 years of age, mean age 12.3 years), 57% were females, 300 (73%) patients were extremely obese (BMI SDS >2.5).
Methods: In all patients a standard two-hour oral glucose-tolerance test was performed. Insulin resistance was estimated by homeostatic model assessment (HOMA-IR), beta cell function was assessed by insulinogenic index.The data were analyzed using ANOVA
Results: Among 411 subjects only 6 had elevated fasting glucose level. Impaired glucose tolerance (IGT) was detected in 8.1% patients with extreme obesity and in 7.8% patients with BMI SDS 2 to 2.5. Except one girl and boy 9 years of age were all adolescents, mean age 14.3 years, 60% were females. Type 2 diabetes (T2D) was identified in 1.2% of all subjects, 4 female and 1 male adolescent. The adolescents with T2D had significantly higher fasting glucose values. There was no difference between the groups with T2D and IGT and NGT in fasting insulin, while the insulin levels markedly increased after the glucose chalenge in subjects with both IGT and T2D. HOMA-IR was increased (>2.5) in 45% subjects. HOMA-IR didn't differ significantly between the groups, while significance of lower insulinogenic index in T2D group could not be statistically confirmed due to the small number of subjects.
Conclusions: The prevalence of IGT and T2D in obese children and adolescents is much lower than in USA caucasians and similar to our neibourghing countries. Insulin resistance is highly prevalent in obese children and adolescents, but insulin levels nor HOMA-IR are effective screening tools. An OGTT is rerequired in all subjects with high risk.

P/049/WED

Prevalence of overweight and obesity among Nigerian children aged 6–18 years

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Background: Childhood obesity appears a potential health problem in this country because of the changing patterns of lifestyle and affluence. It is a significant health problem with medical and psychological consequences for children and adolescents. This study was conducted to study the problem of obesity and overweight among Nigerian children aged between six and eighteen years using the cut-off BMI designed by the International Obesity Task Force (IOTF) for children and adolescents.
Methodology: The study was a school-based cross-sectional survey and it employed a multi- staged random sampling method. Seven hundred and twenty school students aged between six and eighteen years old selected from primary and secondary schools were included in the study.
Results: Only two (0.3%) of the 720 students that were studied were obese and both were females. Twenty (2.8%) were overweight of which seventeen (85.0%) were females and three (15.0%) were

males. Females had a higher prevalence of overweight when compared with males ($P < 0.01$). Obesity was seen only in the high social classes I and II. There was a higher proportion of overweight subjects in the higher social classes when compared with the lower social classes ($P = 0.03$).
Conclusion: It is concluded that Obesity and overweight are relatively rare problems among children in Ile-Ife with prevalence rates of 0.3% and 2.8% respectively and it tends to have a female preponderance. The prevalence of overweight and obesity is higher in children from higher social classes.

P/050/WED
Metabolic syndrome in obese children

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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.
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/051/WED
Maternity obesity as a risk factor of the disturbances of the early postnatal adaptation period of the newborns

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Objective: The aim of the present study was to analyze the characteristics of clinical and metabolic adaptation period of newborn babies of obese mothers.
Methods: A total of 84 newborns of obese mothers (BMI 33.1 ± 0.8 kg/m^2) were examined compare with the control group including 81 newborns of mothers with the normal BMI (22.2 ± 0.9 kg/m^2, $P < 0.001$). The blood samples of pregnant women and newborns (from the umbilical cord between 1–2 and 5–7 days after delivery) were taking for ionized plasma calcium and magnesium level, 25-hydroxy Vitamin D, parathyroid hormone, glucose and conjugated and indirect bilirubin.
Results: The results showed that 78.6 ± 4.5% newborns had the most disturbed adaptation neonatal period of the obese mothers in higher BMI category II and III ($r = 0.5$; $P < 0.001$). Disturbances of the neonatal adaptation period of these newborns were associated with complicated gestation and delivery period of their obese mothers($r = 0.7$; $P < 0.001$). 54.4 ± 6.0% subjects were diagnosed with hypoglycaemia during 1–2 day (in control group 13.2 ± 5.5%, $P < 0.001$). There was a close relationship between macrosomia and hypoglycaemia in early neonatal period ($r = 0.6$; $P < 0.002$). 4 newborns (4.8%) were diagnosed with diabetic fetopathy of obese mothers with gestation diabetis insipidus. Results have showed that during the postnatal adaptation period the newborn babies of obese mothers had early hypocalcaemia (48.4 ± 6.4%) compare with the control group (12.9 ± 6.0%) due to calcium and Vitamin D deficiency (mean levels from the umbilical cord blood were 1.01 ± 0.04 mmol/l and 26.9 ± 3.6 nmol/l respectively). The low level of parathyroid hormone (17.5 ± 3.6 ng/ml) was in the half of the newborns with hypocalcaemia. The analyses showed that the lowest levels of blood calcium of 1–2 day old newborns (0.66 ± 0.13 mmol/l).
Conclusion: Obesity of pregnant women is associated with disturbances of the metabolic adaptation period of newborns babies.

P/052/WED
The effects of a cognitive behavioral therapy program on metabolic syndrome manifestations in obese children aged 7–11

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Objectives: Cognitive Behavioral Therapy (CBT) has been successfully applied in adult obesity and there is evidence for long-term efficacy of behavioral intervention programs, including dietary and physical activity modification, in children. The aim of the study was to examine the effects of a CBT program on metabolic abnormalities in obese children, 7–11 years old in comparison to the outcome of usual care intervention.
Methods: Twenty-four children (20 girls, 4 boys, aged 8.9 ± 1.1, BMI z-score: 3.21 ± 1.42) were randomly selected and received an 11-week CBT program followed by booster sessions and were compared with 24 age- and BMI- matched controls (16 girls, 8 boys, aged 9.7 ± 1.9, BMI z-score: 3.21 ± 0.97) that received usual care intervention. All subjects were recruited from the Childhood Obesity Clinic of our Department. Both groups were re-evaluated 11 months later. BMI z-score was calculated based on the Greek BMI charts. Serum fasting insulin, glucose, HDL and triglycerides were measured by standard methodology.
Results: BMI z-scores did not differ between the two assessments within groups (Final BMI z-score 2.89 ± 1.32 for the CBT group and 2.95 ± 1.38 for the usual care group). However, fasting insulin concentrations (mU/l) significantly diminished in the CBT group (17.13 ± 11.4 vs. 14.11 ± 6.9, $P = 0.04$), while no improvement was noted in the usual care one (17.95 ± 9.97 vs. 16.75 ± 11.7). Similarly, the CBT group showed a borderline improvement in glucose levels (mg/dl) (84.62 ± 6.59 vs. 82.20 ± 7.36, $P = 0.09$) while the usual care group did not (84.63 ± 6.62 vs. 87.31 ± 7.43). No significant changes were noted in blood pressure and lipid profile within groups.
Conclusions: CBT improves fasting glucose and insulin concentrations in obese children, although BMI-z-score remains unchanged. These favourable metabolic effects are not noted in the

obese children receiving usual care. CBT programs may favourably affect the long-term metabolic outcome of obese children.

P/053/WED

Insulin resistance and secretion indexes in healthy Italian children and adolescents: a multicentre study

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Objectives: Type 2 diabetes mellitus (T2DM) is a metabolic disorder of heterogeneous etiology with social, behavioural and environmental risk factors. Insulin resistance is an early abnormality detectable in the normoglycemic, pre-diabetic state, and that the worsening leads to fasting hyperglycemia, impaired glucose tolerance and clinical diabetes.
Methods: We detected values of insulin resistance, secretion and sensitivity indexes (HOMA-IR, HOMA-β% and QUICKI) based on fasting samples in 142 healthy Italian children and adolescents from Pediatric Centres, aged 2.7 to 19 years (10.6 ± 3.8, Mean ± SD), with different Tanner pubertal stages (TS). None had hypo/hyperglycemia (fasting plasma glucose 3.6–5.6 mmol/l), obesity (BMI 17.9 ± 2.4 kg/m^2 M ± SD), or family history for DM. The following formula were used: for HOMA-IR: fasting plasma insulin in mU/l × FPG in mmol/l/22.5; for HOMA-β%: 20× (fasting insulin in mU/l)/(fasting glucose in mmol/l - 3.5), for QUICKI: 1/($\log_{10}$ fasting plasma insulin in mU/l + $\log_{10}$ glucose in mg/dl).
Results: HOMA-IR index slightly increased with TS. HOMA-β% and QUICKI showed a weak variation throughout. No significant correlation was observed between HOMA-IR, HOMA-β%, QUICKI and BMI-SDS or chronologic age.

	N	2.5th	Median	97.5th
HOMA-IR TS 1	73	0.28	1.28	2.69
HOMA-IR TS 2–3	45	0.37	1.2	4.02
HOMA-IR TS 4–5	24	0.42	1.71	4.36
HOMA-β% TS 1	73	32.8	100.2	683.9
HOMA-β% TS 2–3	45	24.6	100.4	548.8
HOMA-β% TS 4–5	24	32.8	183.9	487.4
QUICKI TS 1	73	0.33	0.37	0.49
QUICKI TS 2–3	45	0.31	0.37	0.46
QUICKI TS 4–5	24	0.31	0.35	0.45

Conclusions: HOMA-IR, HOMA-β% and QUICKI are useful tools in the clinical and epidemiological practice for screening and follow-up of subjects at risk for T2DM.

P/054/WED

Postprandial lipid levels in obese children

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Objectives: In the last years childhood obesity has reached epidemic proportions worldwide. As a consequence, cardiovascular risk factors, like dislipidemia can already be traced in the youngest children. These phenomena have an impact on cardiovascular morbidity and mortality later in life. Serum lipids are generally investigated in the fasting state, while data on postprandial lipid levels are hardly available in the literature. The aim of our study was to investigate postprandial lipid levels in children with obesity.
Patients and methods: Lipid loading test was performed in 31 children (17 girls and 14 boys; age (x ± SD): 13 ± 2.9 years; BMI: (x ± SD) 34.9 ± 5.8 kg/m^2) with obesity between September 2007 and July 2008 at the 1st Department of Pediatrics. Triglyceryde, cholesterol as well as HDL-cholesterol levels were determined by standard laboratorial methods, LDL-cholesterol was calculated according to Friedmann's formula. Lipid loading test was performed by consuming a meal containing 82 grams of fat. Blood was withdrawn for analysis at three different time points: (1) on admission (in fasting state), (2) 3 days after introducing calorie-restricted diet (in fasting state), (3) 4 hours after lipid loading on the same day.
Results: On the morning of lipid loading (3 days after introducing calorie-restricted diet) fasting triglyceride ($P < 0.001$), total cholesterol ($P < 0.001$) and HDL-cholesterol ($P < 0.05$) levels were significantly lower compared to the corresponding lipid parameters obtained on admission. (Reduction in LDL-cholesterol did not reach statistical significance). After lipid loading triglyceride level increased by 0.5 mmol/l ($P < 0.001$), total cholesterol by 0.16 mmol/l (NS), and HDL-cholesterol by 0.31 mmol/l (NS), while LDL-cholesterol decreased by 0.13 mmol/l (NS).
Conclusions: Already 3 days on calorie-restricted diet resulted in significant reduction in fasting lipid levels. Lipid loading caused significant increase only in triglyceride level.

P/055/WED

Minimal variation in exercise levels in English children of different weights

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Introduction: The increasing prevalence of childhood obesity is recognised to represent a serious health risk for today's school children as they grow up. It is generally thought that the rise in obesity is due to a reduction in exercise combined with increased calorific intake. Our study seeks to determine whether overweight children exercise less than other children.
Methods: Children from local primary and secondary schools were asked to wear a pedometer for one week. Baseline data including height and weight were recorded. BMI SDS score was thus obtained for each child. The average number of daily steps in one week was plotted against the child's BMI SDS score. Ethical approval was obtained for the study.
Results: Two primary schools and a secondary school participated. Results are shown in the table below.

	Primary 1	Primary 2	Secondary
N	38	33	84
Mean age	9.4	8.7	12.6
Mean daily steps	10785	10275	10167
Mean BMI SDS	0.289	0.474	0.414
P-value	0.033	0.722	0.593

[BMI V Exercise]

The results show that in one primary school there was a significant inverse correlation between a child's weight and the number of steps taken. However this was not the case in the other two schools.
Conclusions: Current government policy aims to significantly increase activity levels in school age children. These results indicate the need for further research into exercise levels in children.

P/056/WED

The influence of education programme on diet and exercise on lifestyle and metabolic status in obese adolescents

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Aims: To evaluate the influence of education programme for patients on lifestyle change, body mass and metabolic status in obese adolescents.

Material and methods: A total of 32 patients with simple obesity, F = 17, M = 15. Body mass (bm) and BMI were determined and lipid profile: TGL, TC, HDL, LDL assessed. Dietary cards and physical activity were analyzed. An education programme on positive lifestyle change was led by a dietician. The follow-up meeting after 3 months.

Results: Mean bm on 1st visit (B1) = 92.34 ± 20.11 kg, mean BMI = 32.15 ± 5.56 kg/m^2. 2nd visit (B2) bm and BMI did not change (92.78 ± 19.06 kg and 32.32 ± 5.15 kg/m^2, respectively) as well as lipid profile: mean CH, TC, HDL and LDL were: 177.19 ± 42.39 mg/dl vs. 166.97 ± 27.35 mg/dl, 116.09 ± 59.95 mg/dl vs. 97.84 ± 44.97 mg/dl, 47.0 ± 10.53 mg/dl vs. 47.50 ± 11.33 mg/dl, 106.96 ± 38.99 mg/dl vs. 99.07 ± 21.45 mg/dl, respectively. In F in B2 lower TC and CH were observed (90.76 ± 18.69 mg/dl vs. 107.38 ± 21.44 mg/dl, $P = 0.04$ and 157.07 ± 25.29 mg/dl vs. 176.86 ± 26.58 mg/dl, $P = 0.06$). The remaining parameters did not differ. Bm and BMI change were similar in both groups: 1.57 ± 2.68 kg vs. 1.29 ± 5.16 kg, 0.46 ± 0.91 kg/m^2 vs. (-)0.17 ± 1.90 kg/m^2. Dietary analysis in B1 revealed that energy originating from fat in M was 37.5% of daily requirement with over dosage of cholesterol intake. One- and polyunsaturated fatty acids intake was within 60–70% of recommended daily dose. 70% of F and 46% of M ate ≤3 meals, 35% of F and 33% of M ate snacks. In B2: energy from fat was lower of 6% with lower cholesterol intake (364.5 ± 161.8 mg/dl vs. 234.1 ± 100.9 mg/dl, $P < 0.05$). The number of F who ate 4 meals increased by 24%. The number of M eating 4 meals was lower of 13%, number of M eating 3 meals increased by 20%. 20% of patients limited snacks. 20% more pts declared daily physical activity.

Conclusions: Within three months of behavioral treatment, body mass and metabolic parameters of studied population did not change, however some nutritional mistakes were limited and declared physical activity increased.

P/057/WED

Family factors and its role in childhood obesity

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Poor family functioning will be associated with inadequate parental monitoring and/or regulation of children's eating and activity patterns. We aimed to examine the relationship between a child's weight and a broad rang of family and maternal factors.

Methods: This cross-sectional study involved 56 obese children (m/f = 30/26), mean age 11.05 ± 3.50 years and 56 mothers. Obesity was defined as BMI scores at or above the 97th percentile for age and gender. Psychological examination was conducted (Eidemiller test of house education) and eating attitudes test (EAT-26). All the analysis were performed with the Statistics 6.0 software, *P*-value <0.05 was accept as statistically significant. ANOVA test was used for unpaired data.

Results: The full families were observed in 71.43%, incomplete 28.57% patients. BMI children was not correlated with BMI mothers ($r > 0.1$). Differences SD BMI were received depending on mothers education: high - Me 4.77 [3.24–5.44] and secondary-special - Me 5.67[4.68–7.20] ($r = 0.0085$). The significantly differences of the test were determined on deflection SD BMI from Me: ''forbid-requirements overweening'' ($r = 0.1$), ''sanctions overweening'' ($r = 0.015$), for girls ''projection male quality'' ($r = 0.045$). By analyzing EAT-26 following data were received: gender differences breaches of the eat behavior, concerned with own body. Children's psyche can catch any uncertainty in parents correctness of the education and his place begins to occupy society ($r = 0.6$). We were received negative correlations: factor hyper patronage ($r = -0.5$), requirements insufficient ($r = -0.61$), unsteadiness of the education styles ($r = -0.52$). The lack of development of the parental feeling($r = 0.56$), overweening requirements ($r = 0.6$), projection on child undesirable quality($r = 0.6$).

Conclusion: Findings indicated on increase the children BMI under using negative acceptance in household education. It was revealed that mothers had difficulties between need of the checking and granting to autonomies child.

Poster Session II: Diabetes and Obesity II

P/058/FRI

Puberty effect upon development and advancement of diabetic peripheral sensomotor polyneuropathy in children with type 1 diabetes

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Aim: To study the effect of puberty and delayed puberty upon advancement of diabetic peripheral sensomotor polyneuropathy (DPN) in children and adolescents with type 1 diabetes.

Material and methods: We investigated 84 children and adolescents with type 1 diabetes. According to puberty stage 5 groups were selected: group with Tanner stage 1 (n = 5), group with Tanner stage 2 (n = 17), Tanner stage 3 (n = 32), Tanner stages 4–5 (n = 62). Eleven adolescents formed the group with late puberty. There were no difference in HbA1c level and duration of diabetes. The disease duration was 6.1 ± 3.0 years (from 0.03 to 10.0), HbA1c - 10.7 ± 2.3% (from 7.2 to 15.3%). Neuropathy diagnosis has been performed according to standard methods that included patient's complaints evolution, sensory dysfunctions and low limbs electromyography data.

Results: The study has demonstrated statistically significant dependence of DPN, development from puberty stage. So, among children, suffered from DPN 20% were in prepubertal period, 45% with development according Tanner 2 ($P < 0.05$); Tanner 3, 50%; and Tanner 4–5, 63%. In the late puberty group, despite short duration of type 1 diabetes and Tanner stages 1-2 DPN has been revealed in 72% ($P < 0.05$). Marked metabolic disorders in the first years of disease and poor control in the following period were noticed in all the patients with late puberty. There factors probably contributed DPN development. Higher frequency of DPN at similar type 1 diabetes duration has been detected in the group of children with late puberty despite puberty absence.

Conclusion: Puberty onset is one of the risk factors, of DPN development in children and adolescents with type 1 diabetes. Severe decompensation of type 1 diabetes causing late puberty might be stronger risk factor for DPN development comparing

with puberty beginning. Puberty absence protects from diabetic complication development only if no hard decompensation of carbohydrate metabolism is present.

P/059/FRI
Experiences related to male adolescents with type 1 diabetes

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Type 1 diabetes is a complex disease which presents particular challenges to male adolescents who are at a time in their lives where they are striving to gain independence and acceptance amongst peers. There is considerable literature discussing Type 1 diabetes and female adolescents, however there is little exploring male adolescents' experiences particularly in the New Zealand context. Findings from this small purposive study therefore provide an important contribution to the literature in this area.

Objectives: The purpose of this study was to explore the experiences of adolescent males with Type 1 diabetes in order to identify factors that impact upon self-management. Themes explored included perceptions of masculinity, identifying support networks, becoming responsible for diabetes self-management and issues that moderate these links.

Methods: A qualitative project involving individual interviews with three 12–18 year-old males was undertaken. An exploratory descriptive approach was utilised in order to gain an in-depth understanding and exploration of participants experiences of this long term condition. Thematic content analysis was used to analyse the data, producing the overarching themes of living with Type 1 diabetes and support networks.

Results: Key findings from initial themes included "doing masculinity" in the context of managing a chronic illness and public and private perceptions of having Type 1 diabetes. "Watchful vigilance", acceptance of peers, and the freedoms associated with the use of new technologies were identified by participants as being fundamental in developing effective self management strategies.

Conclusions: Perceptions of masculinity, new technologies and support are major factors which impact on the lives of participants within this small purposeful study and the findings indicate the need for a larger study to be replicated.

P/060/FRI
5′-Flanking regions of genes encoding selected adipokines *(ADIPOQ, LEP, RETN)* investigated in obese children

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Objectives: The genes encoding adipokines are known as very important in the background of obesity. It is proved direct and causative relation of obesity to prediabetes and type 2 diabetes in children. The aim of this study was searching for polymorphism in 5′-flanking region of the *ADIPOQ* (adiponectin), *LEP* (leptin) and *RETN* (resistin) genes and to compare distribution of their variants in obese children and control non-obese patients.

Methods: DNA was isolated from blood samples of obese children (n = 207; age 12.2 ± 3.1; 108F : 99M) with relative BMI (RBMI) > 120 and from the control group of 100 non-obese adults. Six fragments of 5′-flanking region of three genes *(ADIPOQ, LEP, RETN)* were PCR amplified. Screening for polymorphism was performed using SSCP and DNA sequencing techniques. Polymorphisms found in *ADIPOQ* and *RETN* were genotyped by RFLP test, with the use of endonucleases: *Eam1104I*, *Csp6I, TasI* for *RETN* and *MspI, HphI* for *ADIPOQ*, SNPs in *LEP* were genotyped by direct DNA sequencing.

Results: Polymorphic SNPs were revealed: in *RETN* (-1300G > A, -1258C > T, -420C > G, -358G > A), in *LEP* (-2549C > T, -2548G > A, -188A > C, 19A > G) and in *ADIPOQ* (-11391G > A, -11377C > G). The polymorphism in the *LEP* gene (-2549C > T) is a novel one. The pronounced association concerned distribution of the 19A > G SNP *(LEP)* in relation to RBMI. There was 169.3 ± 21.8 RBMI for AA genotype and 153.8 ± 17.7 for GG genotype ($P = 0.035$). Differences in genotype frequencies were observed between obese and controls for 19A > G (*LEP*) and -11377C > G (*ADIPOQ*). Obese patients bearing both risky genotypes had their body mass (kg) and height (cm) greater than in other obese children (83.8 ± 26.9 & 160.9 ± 17.9 vs. 77.6 ± 25.7 & 156.3 ± 20.1).

Conclusions: The genomic sequences of the 5′-flanking regions of *ADIPOQ, RETN* and *LEP* are highly polymorphic, but only two investigated SNPs (19A > G in *LEP* and -11377C > G in *ADIPOQ*) can be potentially related with children obesity.

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P/061/FRI
Overweight and glycaemic control in young children with T1DM

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Objectives: The aim of this study was to evaluate if our youngest patients with T1DM reaches the target of HbA1c ≤ 7.5% and their frequency of overweight.

Methods: The Diabetes Unit at The Queen Silvia Childrens Hospital serves all patients with Diabetes Mellitus younger than 18 years of age living in the city of Gothenburg and the surrounding area. 55 patients (28 boys and 27 girls) have been diagnosed with T1DM before the age of seven years during the period 050301-090228. Data from their latest visit before 090415 was collected. 44/55 had a diabetes duration of more than 0.3 years. HbA1c was analyzed with DCA Vantage TM Analyzer from Siemens and translated into DCCT standard. Overweight and obesity was defined by the ISO-BMI system in accordance with International Obesity Task Force (Cole, BMJ 2000), which is valid from age two years (n = 37). 18–20% of Swedish children are overweight at age 4 and 8 years (Riksmaten barn 2003, Livsmedelsverket).

Results: Data was obtained from all 44 patients (22 boys and 22 girls) age 6.4 (2.1–10.6) years with a diabetes duration of 2.17 (0.3–3.8) years. 14/44 (32%) reached target HbA1c, 11 of those (25%) reached the double target of HbA1c ≤ 7.5% and no overweight. 4/37 (11%) were overweight 1month after diagnosis and 11/44 (25%) were overweight at their latest visit. The overweight frequency among those with HbA1c ≤ 7.5% was 3/14 (21%) and 8/30 (27%) in those with higher HbA1c. 7/25 (28%) of patients with CSII reached both HbA1c ≤ 7.5 and no overweight compared to 4/19 (21%) of patients on MDI. 6/25 (24%) of patients on CSII were overweight compared to 5/19 (26%) on MDI.

Conclusion: The increase in overweight during insulin treatment needs further exploration. There is a tendency in association between higher HbA1c and overweight. There was no association between CSII and increased overweight frequency. Further research is needed about age-specific strategies for optimizing the insulin treatment of young children with T1DM.

P/062/FRI

Serum proinsulin is the sensitive metabolic risk factor and correlates negatively with the age in obese children

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Objectives: Proinsulin predicts insulin resistance and cardiovascular risk independently of insulin in adults. The proinsulin-to-insulin ratio is used to evaluate the deterioration in glucose tolerance.

Aim: To evaluate proinsulin and PROINS/INS ratio in obese children in correlation to the variety of obesity, insulin resistance and prediabetes criteria.

Patients and methods: A total of 102 children (55♀; 47♂); age 12.6 ± 3.3; 30.4% prepubertal. OGTT with glucose, insulin and proinsulin (PROINS; mean ± SD, pmol/l) was performed. Children were divided: 1) by BMI-SDS: controls BMI-SDS ≤ 1.0, overweight BMI-SDS +1.1 to +2.0, obese BMI-SDS >2.0; 2) with insulin resistance (+IR) and without (nonIR); 3) with prediabetes (IFG/IGT) or NGT. Statistics: ANOVA, Bonferroni, Levene's tests, Pearson's correlations.

Results: In obese groups 0'PROINS correlated with BMI-SDS ($P = 0.0001$), HOMA-IR ($P = 0.04$), IGI (*insulinogenic index*) ($P = 0.007$) and negativly with the age ($P = 0.04$); 120'PROINS correlated with BMI-SDS ($P = 0.002$), 120'glucose ($P = 0.0001$), AUCglu ($P = 0.007$), 120'INS ($P = 0.0001$), AUCins ($P = 0.0001$), HOMA-IR ($P = 0.01$) and negatively with QUICKI ($P = 0.0001$) and WBISI(*whole body insulin sensitivity index*) ($P = 0.0001$). Fasting PROINS/INS correlated negativly with age ($P = 0.007$). In prepubertal obese group 0'PROINS was higher than in pubertal (26.3 ± 18.9 vs.23.2 ± 11.5; $P = 0.05$). In +IR group: 0'PROINS was higher than in nonIR (26.8 ± 14.5 vs.16.6 ± 4.5; $P = 0.006$); 120'PROINS was higher too (63.0 ± 21.7 vs.39.9 ± 12.3; $P = 0.0001$). In IFG/IGT group 120'PROINS differed with NGT (71.0 ± 18.8 vs.49.4 ± 20.9; $P = 0.01$).

Conclusions: 1) The increased fasting and after OGTT proinsulin secretion is frequent disturbance of B-cell function in obese children. 2) The hyperproinsulinemia intensified with the severity of obesity and in patients with insulin resistance and prediabetes. 3) 0'PROINS and 0'PROINS/INS ratio seem to be sensitive markers of metabolic risk in prepubertal obese children.

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P/063/FRI

Serum level of EMAP-II and fibronectin in childhood-onset type 1 diabetic patients and obese adolescent

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Atherosclerosis is earlier and more severe in type 1 diabetes. Endothelial dysfunction is implicated in the pathogenesis of diabetes and atherosclerosis. Endothelial monocyte-activating polypeptide-II (EMAP-II) is a multifunctional polypeptide with proinflammatory and antiangiogenic activity. Fibronectin, an endothelium-derived protein, involved in subendothelial matrix assembly and promote occlusive neointimale formation and atherogenesis. EMAP-II alters fibronectin-based endothelial cell adhesion, sprinding and matrix assembly.

We studied 30 childhood-onset type 1 diabetic patients (age: 20.26 ± 2.11); 30 obese adolescent (BMI: 36.72 ± 7.53) and 28 control subjects. Serum levels of EMAP-II and fibronectin were determined by immunoenzyme assay. Statistical analysis was performed by use Student's test and Person's. The data were presented as mean ± SD.

We found an increase of serum level of EMAP-II in childhood-onset type 1 diabetic patients compared to control subjects (4.95 ± 3.33 ng/ml and 1.3 ± 1.25 ng/ml respectively, $P < 0.05$); also in obese adolescent compared to control subjects (3.32 ± 2.59 ng/ml and 1.3 ± 1.25 ng/ml respectively, $P < 0.05$). Serum level of fibronectin was elevated in childhood-onset type 1 diabetic patients compared to control subjects (367.4 ± 44.04 and 226.17 ± 21.35 respectively, $P < 0.05$); and in obese adolescent compared to control subjects (343.05 ± 61.26 ng/ml and 226.17 ± 21.35 ng/ml respectively, $P < 0.05$). Moreover, there are significant correlation between HbAc1, triglycerides and EMAP-II; between HbAc1, triglycerides and fibronectin levels in group with diabetes ($P < 0.05$), also between BMI, triglycerides and EMAP-II; BMI, triglycerides and fibronectin in group with obesety ($P < 0.05$).

The revealed change of EMAP-II, fibronectin serum levels could reflect an endothelial dysfunction in patients with type 1 diabetes and obesety. Hyperglycemia, dislipidemia appears to be significant factor to contributing elevation of EMAP-II and fibronectin.

P/064/FRI

Fasting Plasma Glucose (FPG) and the risk of impaired glucose tolerance in obese children and adolescents

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Objective: A timely diagnosis of impaired glucose tolerance (IGT) is desirable in obesity. The oral glucose tolerance test (OGTT), the gold standard to diagnose this condition, may not be realistically performed in all patients due to discomfort, labor and cost. The aim of this study was to assess whether one or more biochemical indices measured in fasting conditions could be used to identify obese children at high risk of IGT.

Research design and methods: A total of 563 Caucasian obese children and adolescents (M/F: 315/248; aged 4–17 years) were recruited and underwent anthropometric evaluation and OGTT.Anthropometric parameters, fasting plasma glucose (FPG), fasting serum insulin (FSI) and homeostasis model assessment of insulin resistance (HOMA-IR) were tested in pursuit of a possible threshold to be used as a predictor of IGT.

Results: Thirty-seven children (6.9%) had IGT and one child (0.1%) had type 2 diabetes. FPG, FSI and HOMA-IR were all significantly higher in children with IGT than in children without IGT. ROC curve analyses run for gender and puberty-adjusted FPG, FSI and HOMA-IR were all significant: AUC (95% Confidence Interval) equaled 0.68 (0.59–0.76), 0.66 (0.56–0.76) and 0.68 (0.59–0.78), respectively. The three parameters did not

show significantly different sensitivity/ specificity in the pooled population or in the gender/puberty sub-groups. Thresholds varied among gender/puberty sub-groups for FSI and HOMA-IR, but not for FPG, which showed a fixed threshold of 87 mg/dl.
Conclusions: A gender/puberty independent cut-off of FPG may be considered a screening tool to narrow clinical indication to OGTT in obese children and adolescents.

P/065/FRI
Evaluation of the levels of adipocytokines, ghrelin and metabolic parameters in obese and overweight adolescents

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Aims: Evaluation of the prevalence of metabolic disturbances and assessment of the concentration of selected adipocytokines (leptins, adiponectin, resistin) and acylated gherlin in obese adolescents. Investigation of correlations between the adipocytokines and markers of metabolic disturbances.
Material: A total of 79 obese adolescents and 35 children with normal body weight as controls. Levels of leptin, adiponectin, resistin, acylated ghrelin, hsCRP, TG, TC, HDL, LDL were assessed as well was OGTT. HOMA-IR was calculated. The incidence of hyperinsulinemia (HI) and metabolic syndrome (MS) was evaluated. All the investigations were repeated after 12 months of behavioral therapy (66 children).
Results: MS was diagnosed in 28/78, IR in 54/79, HI in 51/79 subjects. Obese children revealed higher levels of leptin and resistin and lower levels of adiponectin and ghrelin than controls. The level of leptin was higher in girls with IR and HI. Pts with IR, HI and MS had lower level of adiponectin. No relationships were found between the severity of IR and insulinemia and resistinemia. After 12 months the levels of leptin, resistin and hsCRP decreased. Children who reduced their weight (19/66) did not display any improvement in IR, however demonstrated a decrease of the levels of leptin and resistin and increased levels of ghrelin. Children who increased their body mass (25/66) reduced the levels of adiponectin and resistin and increased HOMA-IR on the borderline of significance. In the group of children who did not change their body mass ($n = 22$) a decrease in the levels of hsCRP, leptin and resistin were observed.
Conclusions: A gender-related association between the levels of leptinaemia and IR and insulinemia was demontrated. A negative correlation between the levels of adiponectin and IR and metabolic disturbances constituting MS regardless of BMI was shown. No relationship was found between the levels of resistin and IR and the presence of other metabolic disturbances.

P/066/FRI
Hypothalamic obesity following craniopharyngioma surgery: results of a pilot trial of combined Diazoxide and Metformin therapy

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Background: Obesity is common following neurosurgery for craniopharyngioma. One proposed mechanism is insulin hypersecretion due to hypothalamic damage-induced pancreatic vagal stimulation. Diazoxide decreases insulin release and in combination with the insulin sensitizer metformin may minimize the risk of hyperglycaemia.
Objective: To assess the effect of combined diazoxide-metformin therapy on body weight in adolescents with obesity and craniopharyngioma.
Methods: This was a prospective open-label pilot treatment trial conducted in a tertiary-care pediatric hospital. Nine obese subjects, age 9–19 years previously treated for craniopharyngioma were treated with diazoxide (2 mg/kg divided b.i.d., maximum 200 mg/day) and metformin (1000 mg b.i.d.) orally for 6 months. All received standardized dietary and exercise counseling prior to- and during the study. Whole-body-insulin-sensitivity-index (WBISI) and area-under-the-curve insulin (AUC_{ins}) were calculated at study start and end using an oral glucose tolerance test. Major outcome was the comparison of weight and BMI in the 6 months prior to study entry and after taking study medication.
Results: Seven subjects completed the study: 4M/3F, mean ± SD age 15.0 ± 2.9 years, weight 99.7 ± 26.3 kg, and body mass index (BMI) 35.5 ± 5.6 kg/m^2. Two subjects withdrew due to vomiting and peripheral edema. Of participants completing the study, the mean ± SD weight gain and mean BMI during the 6 months were significantly reduced compared to the 6 months pre-study (+1.2 ± 5.9 vs. +9.5 ± 2.7 kg, $P = 0.004$ and -0.3 ± 2.3 vs. +2.2 ± 1.5 kg/m^2, $P = 0.04$, respectively). AUC_{ins} at study commencement correlated with weight loss ($r = 0.82$, $P = 0.02$) and BMI decrease ($r = 0.96$, $P = 0.009$).
Conclusions: Combined diazoxide-metformin therapy was associated with reduced weight gain in patients with hypothalamic obesity. AUC_{ins} predicted effectiveness of the treatment. The results of this pilot trial justify further investigation.

P/067/FRI
Evaluating the accelerator hypothesis at diagnosis of type 1 diabetes mellitus in children of a mediterranean area during the period 1990–2008

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Objectives: The Accelerator Hypothesis argues that type 1 and type 2 diabetes are the same disorder because the process of developing type 1 diabetes is accelerated by obesity-associated insulin resistance. We aimed to test the hypothesis in a cohort of children with type 1 diabetes by establishing whether a decreased birth weight or an increased BMI at diabetes presentation was associated with an earlier age of diabetes onset.
Methods: A total of 277 Caucasian subjects, aged 1–19 years with diabetes onset between 1990–2008 and positive results for anti-GAD and/or anti-IA2 antibodies were examined in the context of birth weight, weight and BMI at diagnosis, all expressed as SD scores. Measurements were performed 4–6 months after diagnosis. Statistical analyses were performed after controlling for other potential confounding variables such as sex, fasting C Peptide (FCP) or antibodies levels.
Results: No significant association was observed between age at diagnosis and decreased birth weight ($P = 0.145$) or BMI SDS at diabetes onset ($P = 0.5$). No statistical differences were observed when multiple linear regression, adjusted for FCP, sex and/or antibodies levels was performed.
Conclusions: In contrast with the experience with Anglo–Saxon and central European populations, our study with children of a Mediterranean area does not support the Accelerator Hypothesis.

It is likely that the genetic background and other environmental factors may influence the process of developing type 1 diabetes.

P/068/FRI
Metabolic profile in obese children and adolescents

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Objectives: Childhood obesity, an epidemic in developed country is also emerging as a health problem in developing countries like Bangladesh. The study was undertaken to see the metabolic profile of children and adolescents with obesity, attending the Paediatric Endocrine OPD, BIRDEM.

Methods: A cross sectional study from January 2006 to December 2008 was conducted among obese children and adolescents (6–18 years). Children with any other endocrine disorder, dysmorphism/syndrome were excluded. Obesity was defined as BMI ≥ 95th centile for age and sex using CDC growth chart. Children underwent two-hour oral glucose tolerance test with 1.75 g/kg or 75 g of glucose, anthropometric and blood pressure measurement. Fasting serum insulin and lipid profile were measured. Impaired glucose tolerance (IGT) was defined as fasting plasma glucose (FPG) < 7 mmol/l and 2 hour post glucose load ≥7.8 mmol/l to < 11.1 mmol/l. Metabolic syndrome was identified if 3 or more of following criteria were met: BMI > 97th percentile, triglyceride (TG) > 150 mg/dl, HDL cholesterol < 40 mg/dl, Systolic or diastolic blood pressure > 95th percentile, IGT. Data were analysed using SPSS software (version 12).

Results: A total of 161 children presented with obesity. Male to female ratio was 1.3 : 1. Mean age was 10.3 ± 2.5 years. Mean BMI was 27.86 ± 4.1 kg/m^2. IGT was found in16.9% (24 out of 142) and diabetes mellitus in 2.1% of subjects (3 out of 142). Total cholesterol was > 200 mg/dl in 26.3%, TG was > 150 mg/dl in 40.9%, HDL cholesterol was < 40 mg/dl in 50.4% and LDL cholesterol was > 130 mg/dl in 23.3% of subjects. Systolic hypertension was present in 15.5% and diastolic hypertension in 20.4% of subjects. Metabolic syndrome was found in 36.5% of subjects.

Conclusions: The high rate of IGT, dyslipidaemia and metabolic syndrome in this cohort is of concern. Factors contributing towards obesity needs to be identified and strategies should be planned for prevention and management of this health problem.

P/069/FRI
Metabolic syndrome predictors in obese children

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Defining children with metabolic syndrome (MS) is a significant measure to reveal high-risk group for type 2 diabetes and cardiovascular diseases in future. Nevertheless therapeutic intervention at earlier stage becomes more effective for prevention of metabolic and vascular complications in obese children.

Aims: To reveal predictors for metabolic syndrome in children.

Methods: We examined 204 children (M/F: 118/86) aged 10–16 years, Tanner 2–5, with BMI-SDS > 2.0 (2.9 ± 0.7). History was assessed; waist circumference, BP, cholesterol, triglycerides, lipoproteins were measured; OGTT was performed with assessment of insulin secretion and R-HOMA index. MS was defined by WHO-definition. Chi-square, Mann–Whitney-U-test, multiple logistic regression models for multivariate analysis were used.

Results: Prevalence of MS was 29.9% (61/204) and subjects with MS had significantly higher BMI-SDS (3.3 ± 0.5), WC and fasting insulin. Among children with MS 14.8% had IGT and 91.8% - R-HOMA > 3.5. A positive family history for diabetes [OR 3.94 (1.45–10.72)], parental obesity with any of MS criteria (IGT, hypertension, etc.) [OR 3.36 (1.04–10.58)], low birth weight [OR 2.43 (1.02–5.82)], obesity onset before the age of 6 years [OR 3.2 (1.16–8.06)] were defined as predictors for MS. Insulin resistance (R-HOMA > 3.5), severe obesity (BMI-SDS > 3.0) and acanthosis nigricans seem to be the "signs" of MS in children.

Conclusions: Presence of 2 and more definite predictors in obese children leads to the dramatic increase of metabolic risk, therefore preventive strategies should turn their special effort to the patients of high risk group before suffering from metabolic syndrome.

Poster Session I: Diabetes Care, Education, Psychosocial Issues I

P/070/WED
Preliminary study of the presence of depression in children and adolescents with insulin-dependent diabetes mellitus and those who are healthy

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Introduction: The data available as regards depression in children and adolescents are limited. According to the Pan-American Health Organization, it is the fourth cause of the loss of quality of life because of the disability it generates, and for 2020 it will be the second one (Pan-American Health Organization, 1996). The study of the risk factors of depression in children with IDDM (Insulin-Dependent Diabetes Mellitus) would give the possibility of controlling some of them, and help to avoid a decompensation due to ketoacidosis triggered by psychogenic problems.

Objective: To determine if there exist differences in the level of depression (measured through a specific scale) between a group of children and adolescents with IDDM and a group of children and adolescents without IDDM.

Methodology: A semi-structured interview was carried out and the Children Depression Scale, CDS, (Lang and Tisher, 2003). An accidental group of 22 children was sampled.

Group with IDDM: Children and adolescents that are generally treated in the Diabetes Department of Children's Hospital. 11 children with diagnosis of IDDM (7 girls, 4 boys), the average age of that group was of 12.9 years old (R = 11.4–14.5).

Group without IDDM: The totality of participants of this group is of 11 children (4 girls, 7 boys), the average age of the group was of 13.2 years old (R = 10.1–14.5).

Results: In those children with IDDM it was found a Depressive Total greater than those children without IDDM, being $P = 0.041$ and being proved differences closer to the meaning in the items: - Social Problems ($P = 0.087$) and - Several Depression Problems ($P = 0.061$).

Conclusions: There exist meaningful differences in the level of Depression between those children with diagnosis of IDDM when compared to healthy children. The early detection of depression associated with IDDM and its treatment would avoid the evolution of this disorder towards chronicity, producing a greater deterioration of the quality of life of the patients.

P/071/WED

Parent and children reported coping resources and strategies in relation to daily diabetes-treatment challenges considered on the basis of the salutogenic "Sense of Coherence"– theory by Aaron Antonovsky

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Objective: To review research literature focusing parent and children reported coping resources and strategies in relation to daily diabetes-treatment challenges.
Methods: Relevant literature were found by searches in the databases Cinahl, Medline, PsychINFO and SveMed. The findings were viewed in the light of the salutogenic theory: Sense of Coherence (SoC). The reported coping resources and strategies were categorised into the 3 components of SoC: Comprehensibility, manageability and meaningfulness.
Results: 5 relevant research-articles (published 2004–2007) were found.
Comprehensibility: ''Education and training in practical diabetes management and up to date information on diabetes''.
Manageability: ''Organizing the every day life'', ''sharing responsibility'', ''involvement and support from parents'', ''positive attitude toward diabetes and feeling accepted with having diabetes''.
Meaningfulness: ''Cooperation between parents, child, healthcare professionals, social networks and extended family'', ''quality in the involvement within the family'', ''quality in the support from healthcare professionals'', ''support from other families living with diabetes'', ''the child first, diabetes second''.
Conclusions: Implications of importance when working with families with a child having diabetes within the theoretical framework of this salutogenic model includes focus on following issues: The context of the family, possibilities and potential resources within the family, the capacity of the family to achieve their goals, the way of behaving towards the family, the quality in the relationship between healthcare professionals and the family and support to promote development of a strong SoC in the child. The findings of important resources and strategies for coping with daily diabetes-treatment challenges in this study were associated with having a strong SoC. For guiding and supporting families, knowledge about how to achieve a strong SoC in a child is important.

P/072/WED

Engaging lay and professional stakeholders in the development of a training tool for health care professionals to facilitate behaviour change in young people with diabetes (The DEPICTED Study)

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Objective: To identify the consequences of involving lay and professional stakeholders when developing a complex intervention.
Background: A training programme, addressing professional consultation skills/strategies to optimise health behaviour change in patients, was developed for health professionals caring for children with diabetes. Its effectiveness will be tested across a range of children's diabetes services (the DEPICTED study).
Setting and participants: Three one-day meetings over ten months. Lay participants included teenage and adult patients, parents and voluntary sector representatives. Professional participants were from primary care, paediatrics, clinical psychology, social work, psychiatry, nursi ng and dietetics.
Method: Stakeholder involvement was at key developmental stages of the trial intervention. Participants contributed to detailed design of the intervention including assessment of feasibility, acceptability and trial design. Activities included formal presentations and lay, professional and mixed discussion groups. Participants completed formal evaluations.
Results: Each meeting attended by 13–16 lay and 12–14 professional participants, who identified the need for and contributed to the design of a patient-held tool, and influenced the content of a professional training programme and outcome questionnaire. Stakeholders valued the opportunity to contribute to a research process, influence practice, be listened to and self-reflect.
Conclusions: Professional and lay stakeholders can make significant contributions to the design of complex interventions. Challenges include integrating perspectives and priorities of lay and professional participants, and matching group composition and tasks. Clarity about individual roles and autonomy was vital, with participants and researchers needing to understand from the outset how stakeholders can contribute and the importance of considering issues in a broad context, rather than from a personal perspective.

P/073/WED

Diabetes management in young people: rural compared to an urban tertiary hospital in Queensland, Australia

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Significant changes in diabetes management have been introduced for young people with diabetes aimed at improving diabetes control by lowering HbA1c goals. Queensland has a widely distributed population; with 40% living in rural and often remote areas. Provision of appropriate diabetes specialist care is difficult.
Aims: The aims of this study were to: compare glycaemic control between two groups, one from rural Queensland and the other from the largest paediatric tertiary diabetes service in urban Brisbane.
Methods: Health professionals caring for young people with diabetes were asked to participate in a state-wide clinical audit in 2008. The audit collected data on every young person with diabetes <18 years seen during a four-month audit period. This included age at diagnosis, gender and HbA1c. A second audit of patients attending the tertiary centre was undertaken with the collection of additional data including HbA1c, insulin and C-peptide levels at diagnosis to examine possible predictors of future long-term glycaemic control.
Results: The majority of subjects in both groups had Type 1 diabetes ($>98\%$). The mean age $\pm$ SD at diagnosis in the rural group was 11.6 ± 3.8 years and 9.1 ± 4.2 years in the urban tertiary group. There were 46% females in the rural group and 49% females in the tertiary group. The mean HbA1c $\pm$ SD in the tertiary group was higher at $9.2 \pm 1.5\%$ than the rural group at $8.9 \pm 1.5\%$. In the tertiary group biochemical indices at diagnosis did not predict subsequent glycaemic control.

Conclusions: Glycaemic control in both the rural and urban areas of Queensland is unsatisfactory with HbA1c levels exceeding current recommended targets of < 7.5%. These results demonstrate that we should not assume that therapeutic advances will, of themselves, lead to optimal glycaemic control. In order to achieve maximum benefit from therapeutic advances, changes must be resourced, adopted, implemented and include on going education and support.

P/074/WED
Burden of diabetes in CSII-treated adolescents

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Objectives: To investigate the associations between higher burden of diabetes, metabolic control, treatment satisfaction, quality of life and perceived health in CSII treated adolescents with type 1 diabetes.

Methods: Data concerning burden of diabetes, metabolic control, treatment satisfaction, quality of life and perceived health were obtained from 91 CSII treated adolescents (aged 12–18), who were regularly attending four different paediatric diabetes clinics in Sweden. Burden of diabetes was measured with ''Check your Health''. Perceived health and quality of life were measured with Disabkids chronic generic and diabetes module self and proxy version and with ''Check your Health''. Treatment satisfaction was measured with the single question: ''How satisfied are you with your current treatment?''.

Results: Approximately one third (32%) of the adolescents did not perceive any burden of diabetes. The burden of diabetes was not associated with HbA1c, but the adolescents with higher emotional burden took fewer daily bolus doses (4.2 vs. 5.0, $P = 0.02$), there was also a trend that they performed fewer self monitoring of blood glucose per day (2.6 vs. 3.4, $P = 0.056$).

Those adolescents with higher physical, emotional and social burden were less satisfied with the treatment (4.9 vs. 5.3, $P = 0.02$; 4.2 vs. 5.0, $P = 0.02$; 4.6 vs. 5.2, $P = 0.01$, scale 0–6). They reported poorer self-perceived health in all domains. The parents to the adolescents with high social burden perceived the adolescents' health better than what the adolescents did themselves.

Conclusion: It is important to identify adolescents who perceive a high burden of diabetes in order to assist them with appropriate help.

P/075/WED
Effectiveness of non prescriptive diet plan in children with diabetes

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Aim: The involvement of all components of family in nutritional counselling is a critical step of strategy of our Unit to improving diet and lifestyle in diabetic youth. The model used is based on Recommended Levels of Intake of Nutrients for Italian people and mediterranean nutritional tradition. It proposes a plant-based diet, typical of the centre of Sicily, rich in vegetables, fruits, legumes, limiting animal aliments intake and the exclusive use of olive oil instead of animal fat to dress foods.Aim of the study is to investigate if a non-prescriptive diet plan in children with T1DM is unfavourable in comparison with classic prescriptive diet plan, paying particular attention to glycemic control, lipid profile and BMI.

Methods: We conducted a longitudinal and 8-year retrospective study based on a well-defined cohort of children with T1DM aged < 18 years followed-up every 3 months from our Unit beginning from 1999 to 2007.The study included a total of 49 patients with T1DM aged 16–19 years, the average duration of diabetes was 13 ± 4 years. During the study all the patients continued to receive flexible multiple daily injection insulin therapy according to basal-bolus plan. To investigate lipid profile we collected total cholesterol, LDL, HDL and triglyceride levels once a year. To asses metabolic control blood samples were collected for assay of HbA1c every 3 months all years during the study.

Results: There were none abnormalities about lipid profile during years collected. LDL, HDL, total cholesterol, triglyceride and BMI values were normal and their trend was uniform or lower than normal range of general people.

Conclusions: Our outcomes showed no differences between diabetics and normal people at risk to develop metabolic alterations. Non-prescriptive diet plan in children with T1DM, isn't unfavourable in comparison with classic prescriptive diet-plan in particular regards the metabolic control which reflect international data of reference, promoting wellness and integration of the patients.

P/076/WED
Diabetologic education annual stage of diabetologic education. 2001–2008 Hospital De Niños de la Santísima Trinidad (Santísima Trainidad Children'S Hospital), Córdoba, Argentina

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Objectives: To get to know the characteristics of the population that attended to the meetings of the Annual Stage of Diabetologic Education (CAED) during the years 2001 and 2008, in relation to: age, gender, and attendance frequency.

Material and method: It was taken into account the data of the attendance registers of the CAED stages of Children and Adolescents with Diabetes and their families who received assistance at the Santísima Trinidad Children's Hospital, from the year 2001 to the year 2008. During this period there were carried out 8 Annual Stages, with a total of 168 meetings, attended by 615 children, 41.5% of which were male. Taking into account the understanding possibilities, there were created three different groups: From 0 to 8 years, from 9 to 13 years, and from 14 to 18 years.

Conclusions: a) The main attendance to the CAED meetings during the years 2001–2008 belonged to the group from 9 to 13 years old who represents the 42.28% of the total of registered patients. The attendance of the group 14–18 years old was of 36.26%. b) The females had greater attendance in the three different groups during all the analyzed period of time.

P/077/WED
Attitude towards marriage in Indian adolescents with type 1 diabetes

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The multicentric international cross-sectional study was carried out at 3 north Indian canters to assess the attitudes of unmarried

adolescents aged 15 to 25 years with type 1 diabetes, as related to marriage. 30 girls and 30 boys filled up a semi structured questionnaire administered in OPD. All the 30 girls and 27/30 (90%) boys reported distress due to marriage related issues. 12 (40%) girls and 9 (30%) boys thought they would never get married, while 18 (60%)girls and 11 (33%) boys felt it would be difficult to find a life partner.
6 (20%) girls and 3 (10%) boys mentioned difficulty in carrying on a friendship with a partner of the opposite gender, because of diabetes.14 girls thought they would have to pay a higher dowry because of their diabetic status, while 11 boys felt their dowry would be less because of the same reason. 16 (53%) girls and 10 (80%) boys felt that uncontrolled diabetes could cause sexual dysfunction, while 11 (37%) girls and 3 (10%) boys thought the condition could reduce fertility. 3 girls reported worrying about difficulty in managing future pregnancies.
All 30 (10%) girls and 24 (80%) boys said that distress related to marriage related issues caused episodes of poor glycemic control with 23 (77%) girls and 9 (30%) boys saying that this was a major cause of poor control. No correlation was noted between distress and age, socioeconomic status and rural/urban background in either boys or girls. In conclusion, this paper reveals the high prevalence of distress related to marriage in Indian adolescents with type 1 diabetes.

P/078/WED

Summer camps for children with diabetes have a valuable influence on the present life of the participants

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In Japan, more than 1000 children with diabetes now participate annually in summer camps. In addition, thirty-six of these camps (90%) lasts <5 days, however, our Fukuoka camp lasts 8 days. There is also one day of hiking in the spring and fall, a Star Festival in July, and a special X′mas meeting is also held. Our main purpose for these activities is to provide emotional suppport in order to help such children improve their self-esteem, and self efficacy.
Objectives: To evaluate the influence of our activities on the participants′ present life.
Methods: A total of 320 persons participated in these camps from 1969 to 2003, excluding repeat participants. We sent questionnaires to all of them and asked them to evaluate the influence of the camp experience on their present life based on a score of 0 (least valuable) to 5 (most valuable), and also describe the reasons for their evaluation, and then return it. Forty questionnaires were returned by the adressee anonymously. After one month, we obtained one hundred replies. Thereafter, we analyzed the results.
Results: Grade 0 to 2 (less valuable) were 7%, grade 3 (not known) 15%. In addition, 78% of the participants gave score 4 and 5 (valuable, most valuable). In this group, many of the participants wrote long explanations and it was obvious that the camp experience had greatly influenced them. We believe that there were 3 reasons for above results. First of all, the participants realized that they were not the only persons with this disease, i.e. they were not alone. The second reason is that began to feel less fear or anxiety about their disease. The last reason is that the participants began to think about life more deeply based on their experiences at the camp.
Conclusions: As a result, 78% of the former participants who responded to the questionnaire, and at least 28% of overall participants (78 of 280) reported that these camps had made a valuable contribution to their present life.

P/079/WED

Headmasters opinion on diabetes care at Swedish schools

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Objectives: To complete a national survey on diabetes care in Sweden with the attitudes, perceived burden and economical distress of the headmasters of schools responsible for pupils with diabetes.
Methods: All pediatric diabetes clinics in Sweden (n = 44) were asked to randomly pick the name of four schools in their district caring for at least one child with diabetes. A questionnaire was distributed to the headmaster of schools caring for all together 196 children with diabetes 6–16 years of age.
Results: 69/106 questionnaires were received and possible to evaluate. The answers represented all regions of Sweden equally distributed. 96% of the headmasters felt secure and positive to provide support for the children although concern was raised on lack of sufficient medical knowledge and economical resources. All but one headmaster were satisfied with the information given to the school personell including him or herself. In most cases there was a co-operation between the parents, the diabetes outpatient clinic and the school nurse to deliver the information at the diabetes diagnose of the child. 66% did not perceive any risk in caring for children with diabetes during school time although 1 headmaster expressed concerns for the school personell. 74% felt their resources were good enough even during days of school excursions. Some headmasters have contracted extra school personell except for the teachers to fulfill their responsability for the child with diabetes. At most schools the care was shared between at least two adult persons.
Conclusions: Headmasters of schools in Sweden express a positive attitude and willingness to fulfill their duty and resonsibility of caring for children with diabetes during school time.

P/080/WED

Evaluation of a device of passage of the diabetic teenager from the paediatric care structures to those of the adults

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Introduction: In 2001, a device of management of the passage, was set up in our hospital, has fine to support and facilitate a better follow-up of the young diabetic adult, as well as the continuity of this long-term follow-up.
Objective: Evaluate the establishment of the device after 7 years.
Methods: Between 2001 and 2008, 25 teenagers, 10 girls (age averages 16.8 years) and 15 boys (age averages 17.6 years) benefited from the device. Criteria of inclusion: age more than 16 years old, followed bythe diabetology paediatrics for more than 2 years, agreement of the teenager and parents to participate at the project. Strategies: use an index form of transfer filled with the teenager, programming time to fill it, establishing a written guideline which is coordinating by a professional. Criteria of evaluation: evaluation of the impact,quality and satisfaction of the index form of transfer and the device, counts young adults still followed by a adult diabetologist, a number of hospitalizations caused by the diabetes after the transfer.
Results: Impact and quality, first year, return of 7/7 evaluation questionnaires of the index form, satisfaction, the index form of transfer is at present included in the step of transfer. In September 2008, 25 teenagers continued to be followed by a diabetologist, 7 changed diabetologist, 3 were hospitalized because of the diabetes.

Conclusions: The device improved the communication and the collaboration between the various structures and placed the teenager in the center of the step by allowing him to participate in decision-making concerning himself. After the evaluation of the project we To assure an optimal continuity of the care we do not have to limit it to a simple ''administrative'' transfer, but insist on the personal contacts between healthcare team (paediatricis and adults diabetologists) and their patients because there is a risk that the teenager is excluded from a medical follow-up

Poster Session II: Diabetes Care, Education, Psychosocial Issues II

P/081/FRI
Application and evaluation of Arabic diabetes educational program on diabetic patients & their families

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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. 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 234 slides with diagrams and sound to explain every slide with musical background. The program had been divided into o 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 pre-test questionnaire and post-test questionnaire. The test result was 40% while the post-test result was 90%. The program was applied twice through 3 months on 100 patients and the post-test for them was 98%. There was a highly significant difference between glycated HbA1c levels before (HaA1c = 9.21 + 3.65%) and after application of the program (HbA1c = 7.43 + 2.65%). 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.

P/082/FRI
Animated 3D cartoon for the education of young children with type 1 diabetes mellitus and their families

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Objectives: Education of the youngest children with type 1 diabetes mellitus (T1DM) is particularly challenging. Booklets and discussion may not be the optimum for very young diabetics and, in fact, may be of more educational benefit to their parents. We believe addressing educational messages directly to the children improves their willingness to cooperate. We report a novel educational tool - a series of five 3D cartoons lasting 5–6 minutes each linked by a diabetic diary.

Methods: Collaboration between a diabetology team and a 3D computer animator, who has T1DM himself, resulted in animations, targetted at the youngest diabetic children. A simple symbolism for young children is used: insulin is represented by spoons, which are needed for the cells to ''eat'' sugars while lipids look like spaghetti and cells ''spit out'' the ends - ketone bodies. The colours of objects (e.g. ketone bodies are pink in the films as a positive result on a urinalysis strip) emphasise the link between the films and the real world experience of the children.

Part 1 describes normal glucose metabolism in a healthy body, as part 2 diabetes and DKA. Parts 3–5 deal with: initial intravenous therapy and PICU procedures aimed at reassuring children; the switch to subcutaneous therapy; measurements and the daily diabetic plan. In their diaries children use the stickers with happy and sad cell characters from the cartoons to label their results. The animation includes voices and songs to make learning from the films more memorable. The diary includes scenes from the films which can be coloured in to reinforce the message of the film.

Conclusion: The response we have obtained from families shows that these cartoons are helpful for both children and, surprisingly, their parents in understanding what is happening when a diagnosis of T1DM is made, why and how their everyday lives will change and why they are asked to accept and perform apparently unpleasant procedures.

P/083/FRI
Withdrawn by author

P/084/FRI
Post-Graduate education program for dieticians – medical nutrition therapy in diabetes

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In the past decade, with the advent of new technologies and insulin preparations, the need for dieticians specializing in the field of diabetes became inherent. The Post-Graduate Education Program for Dieticians was created in order to address the professional needs of dieticians with the endorsement of the National Councils of Diabetes and the recognition of the Israeli Ministry of Health. The program included clinical and epidemiological aspects of various types of diabetes and its complications, health promotion and prevention of diabetes, clinical guidelines and tools for decision making skills for the nutritional management of diabetes throughout life. Special emphasis was placed on the behavioral aspects of nutritional counseling. The dieticians practiced skills for improving coping strategies in order to enhance adherence to the treatment plan (i.e. motivational interviewing, cycle of change and narrative approach). One hundred and fifty five dieticians from hospitals and clinics throughout the country participated in the first three education programs. All the participants completed the 24 weeks (168 academic hours) program with high attendance rates. Certification was given after completion of the requirements

and written examination. The participants evaluated the course and rated it as excellent, stating that it improved their knowledge and gave them tools for analysis and problem solving. This educational program addressed the need to train dieticians in the nutritional counseling of diabetes. Through knowledge and clinical practice the dieticians enhanced their counseling skills of the nutritional aspects of diabetes and thus promote therapeutic patient education.

P/085/FRI
Serious life events in families of children with type 1 diabetes mellitus

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Objectives: Stress is one of factors seen as contributing to diabetes development.
The aim of this study was to assess incidence rate of serious life events (SE) prior to diabetes diagnosis and examine if there is a difference in occurrence of such events between families of children with T1DM recognized at the age < 5 years and > 5 years.
Methods: There were included 347 participants: 123 parents of children (67 girls, 56 boys) with T1DM onset at the age < 5 years with the mean age 3.1 SD 1.4 years (range 0–5) and 224 parents of children (108 girls, 116 boys) with T1DM onset at the age > 5 years with the mean age 9.9 SD 2.8 years (range 6–17). Parents completed a questionnaire during a routine visit in the outpatient clinic. The questionnaire, especially constructed for the purpose of this study, included questions about experience of SE which can cause chronic stress (as seen in Posttraumatic Stress Disorder). Statistical analysis was done using Fisher's Exact Test, Unpaired t-test, $P < 0.05$ was considered significant.
Results: The number of SE totaled to 243 (in 60% of families) SE appeared more often within 2 year period before T1DM recognition: in 47% vs. 13% of families (RR 0.3, 95% CI, 0.3–0.4 $P < 0.0001$). There was no difference in the number of families of children with T1DM recognized at the age < 5 years and > 5 years affected with SE 49% vs. 45% respectively. In both groups parents divorce was the most common SE which occurs in every 6th family. There was no statistical difference between groups in the number of SE except grandparents death (RR 0.9, 95% CI, 0.8–1, $P = 0{,}004$).
Conclusion: Sixty percent of families with children with T1DM have been affected by serious life events. The most serious life events occurred in the families within 2 year period before T1DM recognition. Children with T1DM onset at the age < 5 years were affected with the same number of serious life events as children with diabetes recognized at later age.

P/086/FRI
Development of cooking classes and cookbook to meet the needs of parents of children with coeliac disease and diabetes

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Introduction: (1) It is widely acknowledged that adherence to a Gluten Free (GF) diet particularly for children with co-existing diabetes is difficult, (2) Expert education by a Specialist Dietitian is essential, Nutrition education encompasses food preparation, label reading and awareness of nutrients at risk. (3) A strict lifelong GF diet is the cornerstone of treatment for Coeliac Disease (CD) to prevent comorbidities
Aim: To promote dietary adherence and improve quality of life by
a) Conducting GF cooking classes for parents/carers of children with type1 diabetes and CD.
b) Developing a GF Diabetic cookbook.
Methods:
a) 28 families with a child with Type 1 diabetes and CD from the Paediatric Diabetes clinic at the John Hunter Childrens Hospital participated (6% of Clinic population).
b) A Needs Analysis was conducted using a standardised questionnaire to determine the content of the cooking classes and cookbook.
c) 2 cooking classes were developed with key stakeholders, recorded on DVD and evaluated. A request for favourite family Gf recipes was sent out for inclusion in the cookbook.
d) All recipes in the cookbook have been trialled and analysed (4) for carbohydrate, fat, energy and gluten content.

Results: The response rate to the Needs Analysis questionnaire was 62% (n = 17). 100% of respondents (n = 17) requested cookbook recipes, especially main meals, party food, school lunch ideas and recipe modification. 59% (n = 10) were interested in cooking classes. 8 families attended cooking classes. Evaluations from the standardised questionnaire indicated that they were highly useful. The cookbook has been endorsed by the Australian Coeliac Society. The DVD and cookbook has so far been disseminated to the 28 families and interested health professionals.
Conclusion: Cooking Classes and the cookbook have provided a valuable educational tool for parents/carers of children with Diabetes and CD. Parents enjoyed networking and described the classes as very useful.

P/087/FRI
Use of a carbohidrate exchange system and its influence on metabolic control in adolescents with type 1 diabetes mellitus

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Objectives: Carbohydrate counting is a technique commonly used to quantify the total amount of carbohydrate (CHO) consumed at a meal or snack. A modified exchange system is a technique where carbohydrate-containing foods are classified in 10g servings. We aimed to evaluate metabolic control, assesed by glycaeted haemoglobin (HbA_{1c}), in a cohort of adolescents with type 1 diabetes (T1DM) who followed a ration-based carbohydrate exchange system (RBCES) compared with those who did not.
Methods: A telephonic survey to 40 adolescents (and/or their parents) with T1DM (age range: 12–16 years) and a diabetes duration of 2–4 years was performed. All subjects had been instructed in RBCES at the moment of diabetes onset in the day-care clinic. Patients with continuous subcutaneous insulin infusion therapy were excluded.
Results: 33 of 40 subjects admitted to use the RBCES. Those subjects who used it presented a better metabolic control respect to those who did not (median HbA_{1c} 8.2 vs. 10.6%; $P = 0.003$). In the group of patients using RBCES, those who used the insulin-to-CHO ratio presented a better metabolic control ($P = 0.004$). Subjects measuring food with a balancer had a significantly better

HbA_{1c} respect to those who did not ($P = 0.024$). No significantly differences were observed for gender or for the person who performed the measurement (progenitor or adolescent).
Conclusions: Diabetes education is essential to achieve a good metabolic control. This study confirms the importance of education at the moment of diabetes onset and suggests that knowledge and skills on ''counting carbs'' should be checked regularly.

P/088/FRI
Transition from pediatric to adult diabetes clinic: evaluation by patients and parents

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Transferring adolescents with diabetes from pediatric to adult care remains a challenge and the outcome is often unknown. The aim of this study was to get more insight into the metabolic and psychological effects of this transition on the patients and to evaluate the effect on the parents. All patients transferred from our university pediatric clinic to an adult centre for more than 12 months during the last five years were included (n = 55). Parents were contacted by phone and a short interview was performed. Afterwards, the patients were contacted by e-mail and asked to send back a structured and standardized questionnaire. The mean age of diagnosis of diabetes was 9.4 years. Mean age at the time of the study was 21.2 years. Satisfaction with treatment provided before and after transfer was assessed on a scale from 1 to 6 (1 = satisfied, 6 = not satisfied). On average the patients were satisfied with their current treatment (mean 2). Comparing previous and current health care, 20.6% of the patients expressed the opinion that the treatment in the pediatric clinic had been more satisfactory, 55.9% thought that their previous and present therapy was not different and 23.5% was more happy with their new doctor. Parents were also satisfied with the current treatment (mean = 2) but judged the treatment in the adult clinic less satisfactory in 32.07%, comparable in 60.4% and better in 7.5%. As to the metabolic control, the post transfer HbA1c values reported by the patients tended to increase in 44.4% and decrease in 40.74%. From these data we conclude that most of our patients have no problems with the transition from pediatric to adult care. Parents however had more difficulties. Further study is necessary to get more insight into the factors that influence these feelings and to ameliorate the transition for both patients and parents.

P/089/FRI
Ten year evolution on diagnosis and treatment of type1 diabetes mellitus in an university center in São Paulo, Brazil

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Many aspects of diabetes management changed in the last 10 years. New methods of monitoring glycemia, intensified insulin treatments
Objective: To evaluate changes on diagnosis and treatment of children and adolescents with Type 1 Diabetes Mellitus (DM1) in the last 10 years.
Methods: Patients followed in the outpatient clinic of Pediatric Endocrinology of Santa Casa School of Medicine, São Paulo, Brazil. Data of 1998 was taken from previous records (n = 193) and data of 2008 from actual patients records (n = 132).
Comparing the results from 1998 against 2008, respectively, we have: Chronological Age (CA): 12.3 years (±3.4) vs. 13.3 years (±4.9) (P = ns); % of females: 55 vs. 50 (P = ns); CA at diagnosis: 7.7 years (±4) vs. 6.8 years (±4) ($P < 0.05$); DKA at diagnosis: 64% vs. 67% (P = ns); glucose values at diagnosis (mg/dl): 478 (±215) vs. 497(±190) (P = ns); patients using NPH: 100% vs. 77% ($P < 0.05$); % of shots of NPH per day (1/2/3): 30/70/0 vs. 12/44/44 ($P < 0.05$); presumed use of bolus insulin:12% vs. 74%; HbA1c (%): 12.3(±3.4) vs. 9.8(±2) ($P < 0.05$). Another important difference, non-numerically evaluated, refers to the self monitoring method used: in 1998 it was done with Benedict reaction in urine and now with capillary blood glucose, given by the public health system. We observed that the age of diagnosis is significantly lower, and that there was no reduction in the high percentage of DKA, thus suggesting the need of increasing awareness about the risk of diabetes in children. Regarding diabetes treatment, we observed significant changes during these last 10 years, being more intensive and better monitored, and reaching a better metabolic control. Values of HbA1c achieved, however, reinforce the need of more efforts to obtain an ideal metabolic control.

P/090/FRI
Multi-centre audit shows similar glycaemic control on different insulin regimes across three centres in Northern England

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Introduction: Current national guidelines promote the use of basal bolus regimes as being the most likely to deliver good glycaemic control. We aimed to study the relationship between insulin regime and HBA1C.
Methods: We chose three centres in North-West England: two representing relatively deprived inner city populations and one clinic from an affluent market town. Patient records were audited. The last 3 HBA1C values from clinic were recorded along with the insulin regimen. HBA1C values within four months of diagnosis were not included.
Results: A total of 289 patients were identified as attending the three clinics. 282 (98%) sets of case notes were studied. The mean age of patient was 12.02 years and the average duration of diabetes was 4.67 years. The overall mean HBA1C was 9.12. The two inner city clinics had HBA1C averages of 9.14 and 9.46 whereas the market town had a clinic average score of 8.81. The table below shows the relationship between insulin regime and HBA1C. None of these differences were statistically significant. Discrete analysis within each centre showed similar results.

Table [HBA1C V Insulin Regime]

Insulin regime	% of patients per regime	Average HBA1c
Twice daily	56.6	9.03
Basal bolus	29.2	9.05
Three times per day	9.6	9.73
Pump	4.6	9.4

Conclusion: Our study does not show an association between basal bolus regime and ''best'' HBA1C. Indeed the children on a twice daily regime were seen to have the lowest HBA1C. Further research into factors influencing glycaemic control is needed.

P/091/FRI

The use of insuflon can improve the early attitude to diabetes when beginning with MDI at the onset of diabetes

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Aim: To investigate the use of indwelling catheters (Insuflon) from the onset of diabetes when beginning with multiple daily injections (MDI). Published results have shown a significant relief of pre-injection anxiety and injection pain. The aim of this analysis was to investigate the psychosocial adaptation to diabetes and diabetes-specific family support.

Methods: Forty-one patients aged 8.1 ± 3.7 years (range 1–15) participated in this open, controlled, randomized study. A local anesthetic cream was used before all insertions. The control group used insulin pens with standard needles. After one week, the indwelling catheter group could choose regular injections but were included in the ''intention to treat'' analysis. The family experience was investigated using the Adaptation to Diabetes Scale (ADS) and Diabetes Family Behavior Scale (DFBS) questionnaires which were given to the families at one and six months after diagnosis. Both scales have Likert scores from 1–5 and have been used from the age of 7 years. Lower scores show a better adaptation to diabetes and diabetes-related tasks. The ADS has 2 subscales: Attitude to diabetes and Emotional difficulty with diabetes and the DFBS has 2 subscales: Guidance/control and Warmth/caring.

Results: Nine out of twenty children in the Insuflon group still used the device after 6 months. 19 families of children aged 7–15 years completed the questionnaires at one month and 15 at 6 months from diagnosis. Attitude to diabetes on the ADS scale was lower for children using Insuflon for initiating insulin injections at 1 month (12.3 ± 1.7 vs. 14.2 vs. 0.8, $P = 0.007$), but at 6 months there was no difference. There was no difference on the other ADS subscale, the DFBS as a whole or the DFBS subscales.

Conclusions: Using an indwelling catheter as an injection aid when using MDI from the onset of diabetes can improve the family attitude to diabetes in the early phase, which can be explained by a lower experience of injection pain.

Poster Session I: Diabetes Care, Education, Psychosocial Issues III

P/092/WED

Dead in bed syndrome: should we be informing our patients?

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Introduction: Sudden nocturnal death in Type 1 diabetes, also known as the ''dead in bed'' syndrome (DIBS), is an uncommon event, accounting for up to 6% of deaths in young diabetic patients, amounting to 2–6 cases per 10 000 patient years. Anecdotal experience suggests some families would welcome discussion on DIBS.

Aim: To determine the current practice of pediatric diabetes clinicians in the UK concerning DIBS.

Method: Clinicians attending the UK Association of Children's Diabetes Clinicians 2008 meeting were asked to complete an anonymous questionnaire. Information was collected on: duration of clinical experience, number of cases of DIBS seen < 20 years, communication practices and reasons behind these decisions.

Results: 49/65 (75%) clinicians completed the questionnaire, of which the majority (92%) were consultants, with a cumulative diabetes experience of at least 562 years. 7 cases of DIBS (1 aged 5–10 years, 3 aged 10–15 years and > 15–20 years) were reported by 5 clinicians, amounting to 1 case per 80 years. 58/65 (89%) of clinicians had not experienced a case. Nobody routinely discussed DIBS, but did so after the parent or young person initiated it (33%), opportunistically (31%) or not at all (33%). If discussed, 43% of clinicians felt that a consultant should be leading the discussion, although many (33%) felt any member of the diabetes team, should be doing so. Reasons for clinicians not informing families included: causing unnecessary anxiety (67%), low prevalence (41%), not enough known about DIBS (39%), it is not preventable (31%) and not enough time in clinic (22%). 3/5 (60%) clinicians who had experienced a case of DIB syndrome had changed their practice as a direct result.

Conclusions: This survey confirms that DIBS is an uncommon event, and there is no consensus as to how and whether we should discuss this sensitive subject. The majority of clinicians who had experienced a case had changed their practice as a direct result. Further exploration of families is recommended.

P/093/WED

Diabetes management at a tertiary university affiliated center – how the adoption of ISPAD guidelines changed achievements

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Varna Children's Diabetes Center is established in 1989 and is constantly striving for improvement of diabetes care. The aim of the present study is to assess the diabetes management in 2007–2008 following the adoption of the ISPAD Guidelines (2000 and 2006–2008), and to compare it with previous time-periods. A total of 150 children and adolescents up to 18 years are under constant care of a team of 2 doctors, 3 diabetes nurses and a psychologist. The mean age of the patients in 2008 is 12.1 ± 4.0 years, mean diabetes duration 4.4 ± 3.8 (0.1–15.0) years. On 2 daily injections are 7.3% of the children, compared to 66% in 1995, 64.3% in 1999 and 12.3% in 2007. In 2007 four or more daily insulin applications use 76.7% of the children, 63.7% with at least one insulin analogue, and in 2008 - 82.0% of the children, 64.8% with at least one analogue. The mean initial hospital stay is 21.3 days in 1986–1988, 14.2 in 1996–1998, 11.0 days in 2007 and 8.1 days in 2008. The number of regular visitors (more than 4 times per year) increases from 20.8% in 1997 to 72.0–77.7% in 2007–2008 ($P < 0.001$), the mean number of visits in 2008 being 5.6 ± 2.6. The patients performing 2 or more yearly HbA1c investigations increase from 47.3% (2007) to 54.0% (2008). The mean HbA1c is 8.76 ± 2.1% in the III trimester of 2007 vs. 8.55 ± 2.3% in 2008, when 36.4% had HbA1c < 7.5%. All mean HbA1c values show improvement from 2007 to 2008. The relative share of initial DKA decreases from 30.1% in 1997 to 21.0% in 2008. The occurence of severe hypoglycemia also decreases significantly - from 35.7% of all patients (in 1997) to 1.3% in 2007–2008, while non-severe

non-frequent hypoglycemia increases - 39.3%. Regular screening determines mild neuropathy (ENG changes mainly) as the most frequent microvascular complication (23.4% in 2007, 10.7% in 2008), and retinopathy as the less frequent - 5.0% of patients with diabetes duration >5 years, all mild. These data will serve as a basis for further improvement of care.

P/094/WED

Transition of care from paediatric to adult services in type 1 diabetes adolescents: to be or not to be lost in translation?

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Transition of care in type 1 diabetes (T1D) adolescents involves major medical and psychosocial challenges, with the risk of care discontinuation and subsequent complications, which need to be evaluated. A longitudinal study was conducted in T1D patients from 6 paediatric and 9 diabetologic departments in the region of Paris, France. Self-questionnaires were filled out by patients, and a medical questionnaire by their physician, at their last visit in pediatrics (T1) and in adult diabetes clinics 0.5–2 years later (T2). 61 patients (60% of regional rate of transition) aged 18.6 years with T1D for 8.8 years, were included in the study at T1. Data were available at T2 in 57 patients, mean delay T2/T1 = 1 year. Median HbA1c did not differ at T2 vs. T1 (9 ± 2.2% vs. 8.9 ± 1.8%), despite an increase in the number of injections (3.7 vs. 3.3 inj/day). Number of DKA episods/year tended to be higher at T2 than T1 (5 vs. 2 patients, $P = 0.06$). Six patients had developed diabetic retinopathy (DR) at T2 (HbA1c = 9.7 ± 1.2%, duration of T1D = 11.2 ± 3.9 years). By comparison with patients without DR, they were significantly older (20.2 vs. 19.4 years) and had higher BMI (25.7 vs. 22.6). 14 patients (23%) were out of diabetes follow up at the end of the study: 7 at the time of transition, who never attended adult clinics despite an organization of transition; 7 others patients dropped out of adult clinics during the study. This study emphasizes the risks of transition of care in T1D adolescents. Poor glycemic control and occurrence of complications at this critical period of development and duration of T1D require specific cares and strategies. The high level of discontinuation in diabetes care, requires a close supervision of patients at the time of translation, by a collaborative organization between paediatric and adult services, as well as an identification of high risk patients.

P/095/WED

NovoPen Echo™ for the delivery of insulin in paediatric patients: a comparison of usability, functionality and preference among patients, their parents and healthcare professionals

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Objectives: NovoPen Echo™ is a new durable insulin pen with an innovative memory function. This study assessed the usability, functionality and preference for NovoPen Echo™ versus NovoPen® Junior and Lilly HumaPen® Luxura HD in paediatric patients, their parents and healthcare professionals (HCPs).
Methods: Pens were evaluated in random order during 1:1 interviews in the three target groups (paediatric patients n = 79; their parents n = 78 and HCPs n = 48) in Germany, France and Canada. Subjects were asked to prepare each insulin pen and perform injections into a foam cushion, providing feedback via a standardised online questionnaire.
Results: On a 1–6 scale (1 = completely agree; 6 = completely disagree), NovoPen Echo™ scored highly for design with its overall appearance receiving the best ratings versus the other devices (mean ± SD: NovoPen Echo™ 1.78 ± 0.87; NovoPen®Junior 2.02 ± 0.93; Lilly HumaPen®Luxura HD 2.38 ± 0.98). Also, 70% of all participants found the size of NovoPen Echo™ ideal (NovoPen®Junior 54%; Lilly HumaPen®Luxura HD 20%). Setting up, adjusting and injecting with NovoPen Echo™ was problem-free for almost all participants. NovoPen Echo's™ memory function scored well for meeting participants needs, with 78% of children, 83% of parents and 79% of HCPs rating it as 1–2 (1 = "meets my needs completely"; 6 = "does not meet my needs") and 89% of children and 94% of parents rating ease of use as 1–2 (1 = "very easy"; 6 = "very difficult"). After using the pens, NovoPen Echo™ was rated the best in terms of satisfaction and 80% of paediatric patients rated it as their favourite pen (NovoPen®Junior 7%; Lilly HumaPen®Luxura HD 12%).
Conclusions: The results confirm the high overall satisfaction with NovoPen Echo™ among paediatric patients, their parents and HCPs. The key features were the appealing design, ease of use and memory function. These attributes are of particular importance for promoting good treatment compliance, which is essential for this paediatric patient group.

P/096/WED

Development of a social activities and independence questionnaire (SAIQ) in paediatric diabetes as part of the DECIDE Study

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Background: Anecdotal evidence from clinical practice and some qualitative work indicate that parents of children newly diagnosed with diabetes often struggle to allow their children to participate in normal social activities. However, no validated measure currently exists.
Aim: To develop a social activities and independence questionnaire (SAIQ) to measure the perceived impact of diabetes upon a child's social activities. The SAIQ has been developed for use in the DECIDE study, a multi-centre randomised controlled trial that will assess the impact of home and hospital management of type 1 diabetes on a number of outcome measures.
Method: SAIQ development involved the identification of relevant activity areas by literature review and from a series of exploratory qualitative interviews conducted with children/young people with diabetes and parents. Purposive sampling strategy sought to maximise response variation reflecting potential age and gender differences in social activities.
Findings: Two overarching activity domains were identified: activities related to school and activities not related to school. Items were developed within these domains and responses scaled according to how much diabetes affects the child's participation in an activity detailed. The draft SAIQ then underwent cognitive debrief interviews with of parents and children aged 3–14 years using concurrent verbal probing techniques.
Conclusion: Exploratory and subsequent debrief interviews of the SAIQ provided evidence of content validity for the outcome measure. The SAIQ will be further validated as part of the

DECIDE study. This new measure of social activities and independence in paediatric diabetes will provide valuable information to help improve the care and quality of life of children and young people with diabetes.

P/097/WED

The comparison of American and Slovenian diabetes camp for adolescents with T1D

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Diabetes camps offer opportunities to promote positive youth development through structured recreation activities and diabetes education.

Objectives: To explore how diabetic adolescents with T1D experience and evaluate the diabetes camp.

Method: In this cross-cultural research 42 American and 42 Slovenian adolescents with T1D aged between 12–18 years completed a pre-structured evaluation questionnaire.

Results: The research has shown significant differences between American and Slovenian adolescents in regard to contentment with the program activities ($t = 4.146$, $P = 0.000$), group acceptance ($t = 5.199$, $P = 0.000$), the staff ($t = 4.285$, $P = 0.000$) and camp facilities ($t = 3.580$, $P = 0.001$). American adolescents are more content with the activities, acceptance, support, understanding and cooperation in the group as well as with the staff, although also Slovenians evaluate their program and staff positively. The American diabetes camp and has a greater variety of activities and offers different age group sessions, in contrast to the Slovenian camp where there is one session for children and teenagers at the same time. There were no statistically important differences found regarding HbA1c ($t = 0.331$, $P = 0.742$, average value of American and Slovenian adolescents was 8.2%), self-control ($t = 0.144$, $P = 0.886$) and camp's influence on adolescent's coping with T1D ($t = 1.454$, $P = 0.150$); they all evaluate diabetes camp as an experience of positive influence on their diabetes management and point out gaining self-confidence and self-dependence. The positive experience of the camp could also be seen in the result of high return rate for campers (100% of Americans and 86% of Slovenians) and in their wish to become a counsellor (88% of Americans and 71% of Slovenians).

Conclusion: Diabetes camps that meet the needs of adolescents with T1D have a positive impact on their diabetes management, self-confidence, and overall satisfaction with camp.

P/098/WED

To evolve a model group for care and social support to people with type 1 diabetic in India

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Objective: To evolve a model for the help of people with Type1 Diabetes in their socio-medical issues in Indian scenario.

Aim: Making life of people with Type 1 Diabetes smooth and hurdle free through the model.

Method: There is no organized infrastructure in healthcare to help people with Type1 diabetes

- We have formed a Non Government Organization (NGO) named ''Society for Prevention and Awareness of Diabetes'' (SPAD).
- We have been doing Regular meetings at the interval of 4 months for last 12 years.
- Till now total meetings done 47 and 130 Type1 diabetic are registered m/f 80/50 age 5–20 years.
- 70 were screened for the complications as per standard recommendations and followed up.

We focus our meetings for following issues

Medical issues:

- Regular blood sugar monitoring, Self management of diabetes mellitus
- Managing hypos, Traveling tips, Emphasis on screening of complications.

Psychosocial issues:

- Focusing on the education, Encouraging (specially female participant) them to be independent in life
- Learning from among themselves and achievers too help and encourage them.
- Make them realize their potential, Helping in their marriages

Result: 11/70 developed nephropathy (24 hours urinary proteins ranging 150–300 mg/day), 9/70 developed mild non proliferative diabetic retinopathy

- Reversal took place in 8 out of 11 in nephropathy and 6 out of 9 in retinopathy
- Psychosocial issue-Male aged above 25, 8 of them are independent and doing well in their respective fields. 5 of them are happily married to non diabetic spouse and enjoying parent hood.
- Female aged 25 years 5 are working and leading independent life have. They are nicely managing their diabetes. 5 girls married 2 with diabetic spouse and 3 with non diabetic and are doing well.

Conclusions: Similar models to be developed to help people with Type1 Diabetes globally.

This model is very effective to help solely in developing countries but also useful for developed countries.

P/099/WED

How much do diabetic children know about diabetes and it's management

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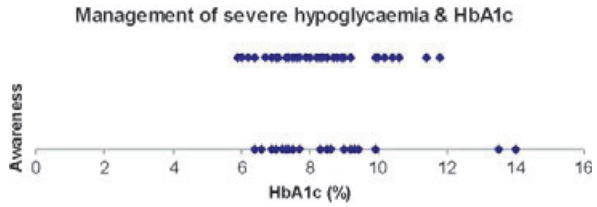
Objective: To develop a knowledge base to target diabetes education.

Methods: Questionnaire survey of children attending the Children's Diabetes Clinic.

Qualitative data was scored to quantify knowledge. There was focus on treatment of varying degress of hypoglycaemia and some variables were correlated with HbA1c.

Results: 79 questionnaires (60%) were returned, 10 were not analysed. There was good general knowledge about diabetes. 88% knew what the target blood sugar was. 90% knew how to manage mild/moderate hypoglycaemic symptoms. Only 68% knew how to manage the situation of an extremely low blood sugar and being unrousable. There appeared to be no relationship between HbA1c and knowledge of hypoglycaemia management (see graph). Level of understanding of diet was suboptimal. 7% thought insulin was not needed when ill. 87% were aware that there were long term complications of diabetes. There was very variable management strategies before exercise.

Conclusions: The need for a dedicated children's diabetes dietition was clearly demonstrated. It also became apparent that the current diabetes nurse was overstretched in her role with the ever increasing numbers of children diagnosed annually. A structured education programme would address alot of issues raised.



[Severe Hypoglycaemia Management]

P/100/WED
The influence of a hospital strike on the metabolic control of children with diabetes

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Objectives: In 2008 the nurses at the Department of Paediatrics at Kolding Hospital were on strike. As the interval between outpatient visits is essential for an acceptable metabolic control, we decided to evaluate whether the strike lasting 2 months had a negative effect.

Methods: HbA1c-values, routinely measured on a DCA at all visits, from the two last visits before and the first two visits after the strike were registered. Other information was found in the patient files. Children with diabetes for <3 months prior to the strike were excluded. Data are compared by t-tests or chi-square as appropriate.

Results: A total of 155 children were included. The interval between visits increased from a mean of 80 days before to 147 days as a result of the strike ($P < 0.0001$), but normalized to 67 days between the first two visits after the strike ($P < 0.0001$). At the two visits just prior to the strike the mean HbA1c values were 8.13 (SD: 1.6) and 8.07 (SD: 1.5) ($P = 0.39$), while it increased to 8.48 (SD: 1.7) at the first visit ($P < 0.0001$) and 8.37 (SD: 1.5) at the second visit following the strike ($P = 0.14$). The corresponding values from the previous year were 8.25 (SD: 1.3), 8.18 (SD: 1.4), 8.22 (SD: 1.4), and 8.32 (SD: 1.5) ($P > 0.05$ for all possible comparisons).For children with a baseline HbA1c of >10.0% no increase in HbA1c during the strike was found.

Conclusion: As the HbA1c remained the same for the last visits before the strike, the higher values at the first visit after the strike confirm that the interval between visits is important for ensuring an acceptable metabolic control. Even though the interval between visits normalised after the strike, the HbA1c remained at the higher level. Children with a very high HbA1c prior to the strike did not experience any change in their metabolic control corroboration previous findings at the same clinic. So even though the strike only lasted 8 weeks it had consequences for the glycaemic control of the children.

P/101/WED
A strike in the Danish hospitals: parents' perception of the impact on the control of children with diabetes

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Objectives: To examine parents' perception of an 8 weeks strike at the Department of Paediatrics at Kolding Hospital we asked them to fill in a questionnaire. The answers were compared to the HbA1c measured just before and the change in HbA1c during the strike.

Methods: The questionnaire was pre-tested on six parents and the parents were asked to fill it in at the first visit after the strike. The HbA1c-values routinely measured on a DCA at all visits from the last visit before and the first visit after the strike were registered. Non-Danish speaking families and children with diabetes for <3 months prior to the strike were excluded. Data are compared by t-test or chi-square as appropriate.

Results: Of 152 questionnaires handed out 113 (74%) were returned. Of these 48 (43%) stated to have needed help during the strike, 36 (32%) had tried to contact the department, but for 13 (12%) in vane. Only 12 contacted their family physician. The 48 children stating to have been in need of help had a higher HbA1c level before the strike than the rest (8.4% vs. 7.7%, $P = 0.004$), but no difference in the mean increase in HbA1c was found (0.62% vs. 0.40%, $P = 0.30$). The children to 49 parents (43.3%) claiming that their diabetes had deteriorated due to the strike had a mean HbA1c level just before the strike of 8.4% as compared to 7.6% for the rest ($P = 0.0009$). Furthermore, the increase in HbA1c during the strike was 0.76% and 0.24%, respectively ($P = 0.01$), and they were more likely to have needed help (29/49 (59%) vs. (15/65 (23%).

Conclusion: Even during a strike lasting only 8 weeks, more than 40% of the parents felt they needed professional help. Most contacted the department and the majority found they had received the help requested. Almost half of the parents included found that their children's diabetes had deteriorated, corroborating the fact that they had a greater increase in HbA1c that the other half, and the fact that these parents had needed help more often than the rest.

P/102/WED
"ESSEN-tial Cares in Diabetes" food and nutrition education program for mothers of children with diabetes or with diabetes and celiac disease

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Diabetes Mellitus (DM) and Celiac Disease (CD) are chronic disorders, the treatment of which is vitally important. The incidence of DM type 1 and type 2 is increasing among children and adolescents. The EURODIAB study shows that the prevalence of type 1 DM in <15 years is increasing by more than 3% annually, and more than 6% per year in children up to 4 years of age. In the last decade and a half, the incidence of type 2 DM has also increased worldwide, induced by obesity among children and youth. Studies have shown a frequent association between CD and type 1 DM, with a prevalence of 13.9%. The co-occurrence of both diseases in children is not uncommon in our context, so they and their families could benefit from an educational intervention tailored to their needs.

Aims: - To provide tools that offer effective support to families and to children with DM and CD to enable them to take control of their treatment for the benefit of their health and quality of life
- To provide food and nutrition education geared to children with DM or with DM and CD, and to their parents
- To promote healthy eating habits that foster proper growth and development
- To give them the knowledge and skills necessary to effectively carry out their treatment, and in particular the food and nutrition plan

Direct targets: mothers / parents / grandparents
Indirect targets: children / families

Activities: Consist of educational workshops on child-focused food and nutrition, theory and practice classes and preparation of

recipes, to promote a healthy diet that includes children in the family menu.
It is a challenge to implement educational strategies and to produce training material specifically for dealing with this pair of chronic diseases that are so complex and rarely addressed together.

Poster Session II: Diabetes Care, Education, Psychosocial Issues IV

P/103/FRI
Clinical application of fear hypoglycemia scale in type 1 diabetic children

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Aversive symptoms of hypoglycemia may result in phobic-like fear of hypoglycemia. Kamps' Scale (CHI) is a reliable instrument in the measurement of children's hypoglycemia fear (HF).
Objectives: To evaluate this scale in our patients and to compare its results with metabolic control, history of severe hypoglycemia (SH) and number of capillary blood controls/day.
Methods: A cross-sectional survey was performed in 54 type 1 diabetic children (B/G: 28/26) attended in our Hospital, 7 to 18 years (11.1 ± 4.2). Inclusion criteria: diabetes duration >6 months and at least 3 capillary blood controls/day. Average HbA1c and history of SH were collected. The CHI was made by the same interviewer. They were also interviewed directly about HF (visual analogic scale, VAS).
Results: Average punctuation obtained by using CHI was 28.05 ± 8.21 (range 12–48), and it could be understood as not much important fear, (maximum 60 points). Similar results were obtained by VAS (5.26 ± 2.74), with a possitive tendency between both assessments. There were not signifcative differences in CHI between children with/without history of SH ($P = 0.21$). Three separate constructs did not discriminate between HF, as similar punctuations were obtained in all of them. Children do not admit that they do more capillary blood controls due to HF. However, there were significative differences between children with low and high CHI punctuation: 4.71 ± 1.36 capillary glycemia/day vs. 5.89 ± 1.96 ($P = 0.012$).
Conclusions: CHI results were similar to direct evaluation of HF (VAS). Both methods show a possitive tendency: the higher hypoglycemia fear, the higher global scale punctuation is. However, CHI is not able to discrimate between children with severe hypoglycemia positive hystory. High CHI do not correlate with a worse metabolic control. There are adaptative behaviors, as tested by higher number of capillary blood controls per day, done by children with higher punctuations. Its impact on diabetes management remains nuclear.

P/104/FRI
The effectiveness of photographic educational material on carbohydrate counting for adolescents with diabetes – preliminary results

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Objective: To present preliminary results from research to evaluate the effectiveness of photographic educational material on carbohydrate counting on diet for adolescents with diabetes.
Research method: Desired sample size of 60 adolescents with diabetes at the Pediatric Endocrinology and Diabetes center. Numbers based on partial sample of 32 adolescents, randomly distributed between groups of those who received orientation on carbohydrate counting with photographic educational material and with a list of foods equivalent. Research followed 3 steps. First, data was collected on age, gender, IMC, HbA1C, schooling, type of educational material and parents average grade level; answer sheets were applied to evaluate previous knowledge on carbohydrate counting; orientation provided on counting with photo material or list. Second, after a month of using the educational material, a quiz by phone was conducted with the sole intent to reinforce orientation. Third, two days later, adolescents were directed to the experimental kitchen to interact with portions of real food and provide answers on amount or choice of carbohydrate. Statistical tools applied on partial data.
Results: The mean age was 13.70 ± 1.87 years, IMC 21.13 ± 2.79 kg/m^2, schooling 8.06 ± 1.31 years, HbA1C 10.17 ± 1.95% and 71.87% female. Parents mean grade level was middle school. Photo group accounted for 43.75% of partial sample, and list group, 56.25%. Adolescents exposed to photo material correct answers were 6.64 ± 2.71, slightly better than those exposed to list of 6.05 ± 2.13, for a total of 11 questions.
Conclusion: A differentiated education strategy for these groups is necessary to improve the control of the diabetes and the health of the adolescents. The photographic educational material can convey the information effectively and be used as alternative tool to provide orientation on carbohydrate counting.

P/105/FRI
Diabetes self-care: perspectives of children and adolescents

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Objectives: Although studies have examined issues relating to compliance, children's understanding of their disease and perceptions around self-care are often not addressed. The main purpose of the study was to explore and identify children's and adolescents' understanding of their diabetes in relation to self-care. The study also sought to identify processes that elicit or inhibit self-care in youth.
Methods: This qualitative study employed an ethnographic interpretive approach using descriptive narratives to illuminate experiences of childhood diabetes and self-care. A sample of 46 participants between the ages of 5–18 with Type 1 diabetes were recruited. Basic demographic data and individual interviews comprised the data collection. Data were analysed using coding methods by Strauss and Corbin (1998). To augment analysis, N-Vivo data analysis software was used.
Results: Participants viewed self-care as an evolving process that changes over the lifespan. However, young children lacked basic knowledge regarding diabetes, and in some cases held misconceptions about the disease, while older participants expressed the need for more information on diabetes. Participants identified concerns associated with having 'lows' and some shared their fears of dying as a result of having a severe 'low'. Many participants wished for a cure while wanting to 'take a break' from diabetes in order to lead a more normal life.
Conclusions: This research validates the significance of engaging in conversations with youth which support their emotional and educational needs. Accessing youth perspectives can lead to greater participation in self-care and medical decision-making across the lifespan. However, this type of discourse needs to occur at an early

age in order to promote self-care behaviors. A major outcome of this study includes the development of psychoeducational resource for young children.

P/106/FRI
Adolescents' view on hospital-delivered diabetes care and a web based intervention

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Objectives: The present study explored adolescents' view on the current outpatient diabetes care delivered in a tertiary care diabetes centre. Information on the adolescents' needs and wishes were used as starting points for the development of a web-based intervention.
Method: Data were gathered by means of a focus group and 13 additional semi-structured interviews, among adolescents aged 13 to 18. Questions in the focus group and interviews focused on: 1) adolescents' problems regarding diabetes self-care, 2) support offered by professional health caregivers and 3) adolescents' opinion on a web-based treatment as supplement to current diabetes care. Audio recordings of focus group and interviews were prepared for analysis through verbatim transcription.
Results: Findings suggest that adolescents are generally content with their level of involvement in their treatment and decision-making. Adolescents are less satisfied about accessibility of the doctor and coordination of three-monthly visits. Especially adolescents aged 15 years and older notice that a better fit to their personal needs is required. More than half of the adolescents in the interviews state they have little or no contact with peers with diabetes, although recognizing that this can be of value to them. Participants recognized the potential value of the internet as a key medium in future diabetes care.
Conclusion: Adolescents report to be generally positive about the delivered diabetes care and support the idea that a web-based intervention improves accessibility of the diabetes team and contact with peers with diabetes. This intervention is currently developed and consists of a personalized page with treatment goals and a functionality for personal contact with the diabetes team; peer contact is facilitated through a chat application and an online forum. Effects on adolescents' diabetes knowledge, self-care, glycemic control, quality of life and satisfaction with diabetes care are being studied.

P/107/FRI
The influence on HbA1c of admission in a specialized pediatric diabetes center

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Aims: To assess the influence on HbA1c of admission in a national center specialized in the evaluation, therapy and medical education of children with T1DM. In Romania, this role is played by the Clinical Medical Center "Cristian Serban" (CCS) for Evaluation and Rehabilitation for Children and Youth, unique in the country, located in Buzias, near Timisoara.
Patients and method: Between 1997 and 2008, at CCS, a number of 358 patients with T1DM aged between 0 and 18 years were admitted three times, for an average of 12 days, at intervals between 1 and 5 years. In all patients we performed frequent daily glucose monitoring, glycemic profile, HbA1c (immunoturbidimetric method, normal range 4.5–5.7%), eye exam and albuminuria. Mean HbA1c was computed for each age group at every admission and statistical difference was assessed with Student t-test. Diabetes education was offered to children and their accompanying family member and consisted in 8 theoretical and practical lessons.
Results: Mean HbA1c for each age group and admission is presented in the table. A significant decrease in HbA1c ($P < 0.05$) from the first to the third admission is noticed in almost all age groups, except for those between 11 and 14 years, in whom the decrease is not significant. The decrease in HbA1c was noticed regardless the type of insulin used or the number of insulin injections.

Admission	Age-group	<7	7–10	11–14	15–18
1	No (%)	43 (12)	89 (24.8)	169 (47.2)	57 (16)
	HbAc, mean ± SD (%)	9.1 ± 2.8	9.5 ± 2.8	9.7 ± 2.4	10.6 ± 2.9
2	No (%)	33 (9.2)	62 (17.3)	160 (44.6)	103 (28.9)
	HbAc, mean ± SD (%)	8.7 ± 1.6	9.0 ± 2.3	9.4 ± 2.1	9.8 ± 2.3
3	No (%)	29 (8.1)	39 (10.8)	133 (37.1)	157 (44)
	HbAc, mean ± SD (%)	8.2 ± 1.2	8.6 ± 1.9	9.4 ± 2.1	9.5 ± 2.2

[HbA1c depending on age group and admission]

Conclusions: The hospitalization of children in CCS, where diabetes education is the central activity, leads to a significant improvement in glycemic control. The age-group 11–14 years (puberty group) is the most difficult to manage.

P/108/FRI
What is the true impact of a diagnosis of coeliac disease in children with type 1 diabetes?

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Objectives: To study the effect the diagnosis and management of coeliac disease has on glycaemic control, growth, and quality of life, in children with both coeliac disease and type 1 diabetes.
Methods: 18 children with both coeliac disease and type 1 diabetes were matched with one diabetic control without coeliac disease. HbA1c levels and growth parameters were compared between the groups. Responses to the PedsQl 3.0 questionnaire were also obtained, together with responses to a non-validated coeliac disease questionnaire to assess quality of life. Attempts were also made to assess compliance with a gluten-free diet.
Results: No statistically significant differences in HbA1c were found between groups, and no significant improvement or deterioration in HbA1c was found after commencing the gluten-free diet. There were no statistically significant differences in growth parameters between groups, or in PedsQL quality of life scores, except for higher scores relating to psychological problems with management in control subjects ($P = 0.028$).
Regarding the coeliac disease questionnaire, responders reported difficulties in maintaining a strict gluten-free diet, and 70% found it harder to manage coeliac disease than diabetes. 50% reported that they would have liked more information about coeliac disease on diagnosis. 80% did not know of any long-term complications associated with coeliac disease. In no case was there evidence of regular coeliac disease review during diabetic clinic. Compliance with a gluten-free diet appeared to be 67%.
Conclusion: No conclusive significant differences in glycaemic control, growth, or quality of life scores were found. However, our results highlight the need for coeliac disease to be addressed in more detail during clinic to determine which of these children need more support. Patient and parent education regarding coeliac

disease should also be addressed regularly to ensure compliance is maintained.

P/109/FRI

Paediatric ONSET-Study: impaired QoL in children and depressed mood in mothers at onset of DMT1 in children

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Aims: The diagnosis of DMT1 is a significant burden for children and parents. The psychological implications of the diagnosis and their determinants were investigated in the first year after diagnosis. This is a part of the pediatric ONSET-Study about sensor-augmented pump-therapy in 5 European pediatric diabetes centers. Data on mother's well-being and children's quality of life (QoL) following the diagnosis will be presented.

Method: Prospective study with children (aged 1–16 years), randomized within 4 weeks of DMT1-diagnosis. 160 children (age: 8.7 ± 4.4 J.; 47.5% girls). Mother's psychological wellbeing was assessed by the WHO-5 questionnaire. Children's QoL was evaluated in children via KIDSCREEN-27- and by parents via KIDSCREEN-27-proxy-questionnaires.

Results: The mean sum-score of mothers in the WHO-5 (negative–positive: 0–100) was 46.3 ± 22.8 with 55.3% of mothers with a sum-score ≤48 indicating depressed mood. The mothers of the children <6 years were significantly more affected than those of older children. 69% of mothers with children <6 years. showed symptoms of a depressed mood. T-Values of the children's QoL scores (parents' perspective) for physical wellbeing (39.4 ± 9.8), psychological wellbeing (40.1 ± 10.7), social integration (44.7 ± 13.9) and school (46.3 ± 12.7) were significantly lower than the European norm data (each $P < 0.01$). Children rated their QoL according their parents' assessments. Mainly physiological (41.5 ± 8.9) and psychological wellbeing (44.4 ± 10.7) were significantly impaired compared to European norm data. After adjusting the data according to children's age there were no significant differences between the five diabetes centers.

Conclusion: The high psychological burden of mothers, especially of those with young children and the impaired Quality of life of children diagnosed with diabetes underline the importance of an integrated medical and psychosocial care in the first phase of coping with the chronically disease.

P/110/FRI

Intensifying insulin treatment in type 1 diabetes: evaluation over 10 years in 8176 children and adolescents attending diabetes camps

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Objectives: To establish a precise classification of insulin regimens in children and adolescents with type 1 diabetes; to describe their evolution over 10 years and the correlation with HbA1c, in a large representative national sample of patients.

Patients and methods: The data base of the national association which organizes diabetes camps allowed evaluating 8176 children and adolescents (age 12.8 + 2.7 year, diabetes duration 5.2 + 3.4 year) at admission in summer camps between 1998 and 2007 (707–896/year). From the raw data including the type of insulin (rapid, long and premixed; human or analog) at the several times of the day (breakfast, lunch, afternoon, dinner, bedtime), 823 different combinations were found (128–216/year) and they could be classified in 166 types of regimens (50–73/year), and 6 major groups: <2 injections, 2 injections (3 subgroups), 2 injections plus extras (3 subgroups), 3 injections (premixed and unclassified), basal-bolus and pump.

Results: Over 10 years, the main changes were: shift from human insulin to analogs; decrease of 2 injections from 42 to 19%; drop of premixed from 21 to 4%; decrease of unclassified from 30 to 15%; increase of basal-bolus from 13 to 48%, and of pump from <1 to 13%; changes depended on age and diabetes duration. Mean yearly HbA1c varied from 8.24 to 8.53%. HbA1c was significantly higher with regimens using exclusively premixed insulins, but there were no differences between the other regimens (multivariate analysis). HbA1c showed a significant but minor decrease, by 0.02% per year, but the decrease was similar with premixed and other regimens.

Conclusion: A major trend in intensifying insulin treatment in children and adolescents with type 1 diabetes has been accompanied by a modest improvement in HbA1c. No insulin regimen has shown any better results, except over premixed insulins.

P/111/FRI

Ethical concern of predictive newborn screening: a utilitarian perspective

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Background: Newborn screening tests for metabolic, endocrine, and hematologic disorders currently present in infants (Kenner & Moran, 2005; Green, Dolan, & Murray, 2006). Predictive newborn screening has become widespread and tests for conditions that may develop in the future.

Issue: WHO argues that newborns should be screened at risk for developing widespread preventable disorders and whose costs of treatment would be greater than those of screening. From a utilitarian perspective, family members and healthcare providers must anticipate potential risks and benefits for each alternative action to identify the morally required or "ethical" action producing the best outcomes (Rodney, Burgess, McPherson, & Brown, 2004). Despite potential benefits of predictive newborn screening, significant ethical issues arise: (1) limited predictability of testing, (2) psychosocial risks, and (3) lack of prevention or treatment available.

Conclusions: As a result of limited predictability and difficulty ascertaining severity of tested conditions, there are no guarantees a serious illness will develop. Further, children face several psychosocial risks. Lastly, there may be lack of preventative measures or treatment for diseases identified through screening. Because of these ethical challenges, the utility of family members, their children, and healthcare providers is reduced as a result of predictive newborn screening.

Poster Session I: Diabetes Care, Education, Psychosocial Issues V

P/112/WED

Pediatric diabetes in an underserved area of central India: challenges and discrimination

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This paper reports on the Free Insulin Project for children with type 1 diabetes in central India. 28 children and adolescents aged 2 to 22 years, including 20 boys and 8 girls, have enrolled in the project. Of the 24 patients aged >6 years, 9 (37.5%) reported missing their monthly visits more than 3 times in the preceding year. These included 4 boys (25%) and 5 girls (62.5%), for reasons varying from "insufficient money" (100%), "adults busy in agricultural work and not available to accompany me" (55.5%) and "school/ job pressures" (44.4%). The patients reported a high level of discrimination at home, school and in society. All reported verbal abuse (unwanted sympathy) by members of extended and nuclear family. 8 boys (50.0%) and 6 girls (75.0%) reported verbal abuse (scolding, taunting) by family members. All reported 'feeling unwanted at some time or the other'. 6 boys (37.5%) and 2 girls (25%) were reported short temper ness. In the school, 6 boys (37.5%) and 2 girls (25.0%) reported verbal abuse by classmates. A significant percentage of respondents (25% boys, 37.5% girls) reported verbal abuse at the hands of neighbors or religious leaders. Of the 24 patients, 17(12 boys, 6 girls) had missed insulin doses more than 10 times in the preceding 3 months. Many of them did so because the insulin supply was inadequate to last the months. 10 boys (62.5%) and 4 girls (50.0%) preferred premixed insulin twice daily, as they did not like to inject themselves in school. The rest were on basal - bolus regime. Only 2 boys (12.5%) practising SMBG, 2–3 times a week. HbA1c estimation had been done more than once in the preceding year for 8 boys (50.0%) and 3 girls (37.5%). This paper highlights the challenges and discrimination faced by children with diabetes in Central India, and focuses on the efforts being made by the diabetes care team to provide quality care in an underserved area of the world.

P/113/WED

Is there a relationship between insulin regimen and dietary intake in adolescents with type 1 diabetes?

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Current literature indicates that adolescents with type 1 diabetes (T1D) consume a diet high in total fat, saturated fat and cholesterol, and low in fruit and vegetables and fibre. At present, there is scarce information available describing the relationship between insulin regimen and dietary intake in this population. This study aimed to investigate and compare the impact of 3 insulin therapies: three injections daily (TID), multiple daily injections (MDI) and continuous subcutaneous insulin infusion (CSII) on dietary intake of teens with T1D. We hypothesized that those on MDI and CSII would be consuming more sucrose and carbohydrate (CHO) while those on TID would have higher intake of fat and protein.

Results: Ninety-seven subjects between the ages of 14–18 years were recruited during bi-weekly outpatient diabetes clinics and via phone calls to eligible participants. Dietary intake information was collected using the validated Youth/Adolescent Food Frequency Questionnaire (Harvard School of Public Health), and analyzed for Energy, CHO, Sucrose, Fibre, Protein, total fat, and saturated fat. No significant differences were found between the groups on any of the nutrients studied using ANNOVA. Calories $P = 0.30$, carbohydrates $P = 0.13$, protein $P = 0.71$, fat $P = 0.69$, sucrose $P = 0.06$, fibre $P = 0.46$. Univariate and multiregression analysis with the independent variables was performed and no significance was found. These data indicate that the choice of insulin regimen is not a major factor in predicting dietary intake.

P/114/WED

Explaining the relation between diabetes support and diabetes stress in adolescents: the influence of diabetes care autonomy, gender and age

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Objective: Earlier reports (Malik & Koot, 2009, under review) suggest that diabetes care adherence reduces diabetes stress and enhances diabetes control, while diabetes stress impairs diabetes control. Although diabetes support seems to enhance adherence, it simultaneously increases diabetes stress. This study aims to explain why. An established model indicating an important role of diabetes-related stress in diabetes control (Malik & Koot, 2009) was revised and adolescents' autonomy was introduced as a mediator between diabetes-specific support and diabetes stress.

Method: The study included 11–19 years old youngsters with type 1 diabetes. A total of 437 adolescents (54.8% girls; mean age 14.7 years; mean diabetes duration 6.1 years) participated in the study. Metabolic control was assessed by measuring A1c and adolescents filled out questionnaires during their visits in their local clinics. Questionnaires for family members were sent and returned by mail. Each hypothesis was tested using Amos version 7.0. Multigroup analysis was conducted on the final model to test generalizability of the model across gender and age.

Results: The final model presented good fit indices (i.e., $X^2(df = 19) = 37.19$, GFI = 0.98, CFI = 0.96, RMSEA = 0.047) retaining all the existing regression paths significant. Autonomy appeared to mediate between diabetes support and diabetes stress, Diabetes support was related to reduced autonomy. However, while increased autonomy was related to reduced diabetes stress in boys and older adolescents, it was related to increased diabetes stress in girls and younger adolescents. Diabetes autonomy itself was strongly related to age ($r = 0.64$, $P = 0.01$).

Conclusion: Adolescent autonomy is the typical developmental issue which explains the negative effect of diabetes-specific support on diabetes-related stress for some groups, and thus should be considered in development of treatment regimens.

P/115/WED

The impact of diabetes and celiac disease in the quality of life in children and adolescents

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Chronic diseases affect the quality of life (QOL), but no general agreement exists on the relationship between the severity of the disease and the QOL. On the other hand, few are data comparing QOL in different chronic disease in the same clinical setting.

Aims of the study were: 1) to investigate general and health related QOL of children with diabetes (T1DM) and in patients with coeliac disease (CD) 2) to compare the QOL in these 2 groups of patients. We studied 67 outpatients: a) 35 with T1DM [(12 male: aged 13.0 ± 3.1 year; 23 female: aged 13 ± 2.8 year; mean duration of T1DM 61 ± 47 months)], b) 32 with CD [(8 male: aged 10 ± 2.9 year; 24 female: aged 9 ± 2.6 year, mean duration of CD 53 ± 38 months)] using the Paediatric Quality of Life Inventory (PedsQL), a self-administered questionnaire. The PedsQL Generic Core Scales is designed to measure health-related quality of life (HRQOL) with 23 items subdivided in 4 scales (physical, emotional, social, school). In T1DM patients we measured the degree of metabolic control by glycated haemoglobin and in CD patients the diet compliance with dietetic recall and laboratory markers. T1DM patients showed a satisfactory metabolic control (HbA1c 8.0 ± 0.87%). Twenty five out of 32 CD patients showed a strict dietetic control. Considering the different items inside each group we demonstrated that in T1DM patients the major concern is related to emotional functioning, while in CD group school functioning was the most impaired. Surprisingly children with CD had a significantly lower QOL related to social functioning than T1DM ones ($P = 0.005$). The same result was found for school functioning. No difference was found for physical/emotional functioning. These data disagree with common opinion that children with CD have a better adaptation and functioning, because the disease is generally considered less severe than diabetes. It is conceivable that a multisciplinary approach to patients with T1DM can be responsible for this difference.

P/116/WED

The efficacy of a group therapy program for teens with elevated HA1c levels

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The present study reports results from a group therapy program for adolescents with poorly controlled diabetes and their parents. Past research has identified that psychological treatments involving motivational interviewing approaches appear promising in improving glycemic control in teens with diabetes, but are in need of further research. Twelve adolescents (8 males and 6 females) between the ages of 13–17 years (M = 15.1 years, SD = 1.4) with poorly controlled diabetes attended an 8 week therapy group informed by motivational interviewing and cognitive behavioral approaches. Participants had been diagnosed with diabetes for 6.5 years on average (SD = 2.7) and had a mean Ha1c level of 11.61 (SD = 1.90) prior to their attendance in the group. Adolescent's self-reports regarding, self-efficacy, quality of life, family support, symptoms of depression and their readiness, confidence and level of importance placed on improving their diabetes care were collected prior to their participation in the group, at the end of eight group sessions and at two months follow-up. Results indicated that the importance teen's placed on improving their diabetes care [t (11) = -3.17, $P = 0.004$] and their self-efficacy regarding their diabetes care [t (11) = -3.75, $P = 0.003$] increased from pre-group to the end of the group sessions. Teens had a significant decrease in HA1c levels from pre-group to follow-up 2-3 months after the end of the group sessions [t (10) = 2.42, $P = 0.036$). Data from a therapy group in progress involving 9 additional participants will also be included in the presentation. Strategies around engaging adolescents and their families in group processes will be discussed. In conclusion, the study's results suggest that the described group therapy program appears to be a useful approach in improving teens' Ha1c levels, motivation and self-efficacy regarding their diabetes care.

P/117/WED

Is the factual nutritional intake of children and adolescents with type 1 diabetes concordant to the general recommendations? observation in a small cohort in Austria

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Objective: The aim of this study was to evaluate the nutritional intake of children and adolescents with type 1 diabetes and to compare the factual intake to current ISPAD recommendations. Daily intake of all nutrients was documented for 7 consecutive days and retrospectively analyzed for the amount of carbohydrates, protein and fat.

Methods: 62 children and adolescents with type I diabetes were invited to report their daily nutritional intake over a week and were asked to answer a questionnaire on their eating behavior. Based on these self reported data the daily intake of carbohydrates, proteins and fat was calculated and compared to the general nutritional guidelines for young patients with type 1 diabetes (ISPAD Consensus Guidelines).

Results: 25/62 (48% male, 52% female) questionnaires and nutritional records were available for analysis. Mean age of this cohort was 13.0 years (±4.3), mean diabetes duration was 4.3 years (±2.8) and mean HbA1c was 7.7% (±0.6). Intake of carbohydrates was higher than recommended, 195.8 g/day (±49.5) vs. 130 g/day ($P < 0.0001$), so was the intake of proteins 66.9 g/day (±18.8) vs. 39.7 g/day (±11.9) ($P < 0.0001$). Fat intake was lower than recommended in the guidelines 19.1%/day (±27.7) vs. 30–35%/day.

Conclusions: The amount of carbohydrates was significantly higher than suggested in the recommendations, so was the intake of protein. The elevated protein intake might be explained by a preference of carbohydrate-free food intake in terms of snacks with sausages, cheese and meat in Austria. The intake of fat was significantly reduced in the observed group. This observation shows that the factual nutritional intake is not concordant with the recommendations. A widely spread information about nutritional guidelines with well informed doctors and dietitians will result in a higher level of awareness among young patients with type 1 diabetes.

P/118/WED

Diabetes care in Swedish schools – a national survey

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Objective: The aim of this national multi-center study was to investigate the perceptions of diabetes care in school reported by children and adolescents with type 1 diabetes and their parents.

Methods: Children that had completed preschool class or some grade in the nine-year compulsory school during spring semester 2008 were asked to participate in this study. Data were collected using separate questionnaires for the children and their parents. All pediatric diabetes centers in Sweden (total population 7712 patients with mean HbA_{1c} 7.18%; Mono-S standard) were invited to participate in the study. Each centre was asked to consecutively include 5% of the diabetic population at their centre during ordinary outpatient visit.

Results: Out of 44 eligible centers 41 were able to participate. The participating centers represented 97% of the total pediatric diabetic population. 317 children and adolescent and 323 parents answered the questionnaires. The mean age of the patients was

11.4 ± 2.7 years and HbA_{1c} was 6.9 ± 1.2% (approximately 7.9%; DCCT standard). Continuous subcutaneous insulin infusion was used by 37% of the participating children. 54% of all children and adolescents did not have any school personal that had the principal responsibility for the diabetes care during school time. 50% of the parents believed that the knowledge about diabetes care was to low among the teachers. 21% of the parents gave regularly less insulin than needed in the morning because of fear of hypoglycemia during school time. 40% of the children were not sure if they could get help from school personal in case of hypoglycemia.

Conclusions: This nation-wide study demonstrates serious deficiencies in the support of self-care management to children and adolescents with type 1 diabetes in Swedish schools. The lack of support could lead to impaired school performances because of increased time with hyperglycemia and consequently lower mental performances.

P/119/WED

Quality of life of siblings of a child with type 1 diabetes

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Objectives: Diabetes is an illness that affects the whole family. To date, little is known about the quality of life (QoL) of siblings of children with type 1 diabetes: this study reports on siblings' QoL and the association between QoL and diabetes severity.

Methods: Thirty eight siblings (6–18 years, 23 boys) completed the Child Health Questionnaire (CHQ-CF 87, Landgraf et al., 1999) which includes 12 QoL domains. Siblings' QoL was compared to QoL ratings of a Belgian reference group. HbA1c-value and time since diagnosis were noted.

Results: Siblings scored significantly higher on most QoL domains compared to the reference group (e.g. less Bodily Pain, fewer Behavioral Problems and higher Self-Esteem). No gender or age effects were found. Higher HbA1c values were related to lower scores on Family Activities ($r = -0.38$, $P < 0.05$). Time since diagnosis was related to higher scores on Physical Functioning ($r = 0.44$, $P < 0.05$) and General Health ($r = 0.44$, $P < 0.01$).

Conclusions: Siblings reported a good QoL, in many (7/12) domains better than their peers. Lower scores on family related domains may be due to the impact diabetes has on day to day family functioning, especially for those families where diabetes regulation is more of a challenge (higher HbA1c). The finding that ratings on some QoL domains were higher with increasing time since diagnosis may indicate that siblings adjust over time. As siblings often play a supportive role for their brother/sister, future studies should further investigate the impact of diabetes on siblings and the association between illness severity and QoL. These data may help to define the need for support for siblings.

P/120/WED

Effective treatment of hypoglycaemia in children with type 1 diabetes: a randomised controlled clinical trial

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Effective treatment of hypoglycaemia in children with type 1 diabetes (T1D) is essential, but has a limited evidence base. Some treatments patients choose (eg. jellybeans) may be less effective than glucose. We hypothesised that glucose tablets would be most effective in children with T1D and aimed to compare 4 common treatments for hypoglycaemia in a randomised trial during a diabetes camp. Written informed consent was obtained. Camp leaders were trained in administering the research protocol and used cross-calibrated blood glucose meters. Hypoglycaemia was defined as blood glucose < 4 mmol/l. We compared 4 treatments - glucose tablets, jellybeans, orange juice and Mentos dragees®. An equivalent dose of glucose was calculated for each patient for each treatment (0.3 g glucose/kg) and provided to each leader. Treatment was randomly assigned for each episode of hypoglycaemia using a sealed envelope. Glucose was measured at time 0, 2, 5, 10 and 15 minutes. If hypoglycaemia persisted treatment was repeated and glucose measured at 25 minutes.

191 episodes of hypoglycaemia were recorded in 38 children (1–12 episodes per child), with 2 episodes excluded because of protocol violations. Blood glucose at 15 minutes ($P = 0.026$) and change in blood glucose at 10 ($P = 0.034$) and 15 ($P = 0.005$) minutes were significantly different between treatment groups, with jellybeans producing the lowest and slowest response. Glucose tablets produced the greatest response, but did not differ significantly from juice or mentos dragees®. Repeat treatment was more often needed with jellybeans ($P = 0.058$). Jellybeans are significantly less effective treatment for hypoglycaemia than the other three treatments. Mentos dragees® are of similar efficacy to glucose tablets or liquid glucose and are more palatable. Treatment with 0.3 g/kg of glucose (in all but the jellybean group) effectively resolved hypoglycaemia in most children, with 15 minutes often required to normalise blood glucose.

P/121/WED

Evaluation of a combined blood glucose monitoring and gaming system for motivation in children and young adults with type 1 diabetes (T1DM)

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Hypothesis: The coupling of a blood glucose (BG) meter and gaming system (Bayer's Didget™) designed to reward points for short and long term BG testing based on the frequency of testing and measured BG values would be clinically accurate and perceived as motivating in BG home management.

Methods: The performance and acceptability of the system was evaluated after IRB approval and informed consent/assent was obtained. 147 subjects, 4–24 years old, with T1DM were enrolled and completed one in-clinic visit; 58 subjects also participated in a home-use test for 3–5 days.

Results: Accuracy was assessed for subjects by comparing subject meter results to the health care professionals (HCP) meter results, and for subjects ≥13 years, to YSI values obtained from deep finger puncture. Subject and HCP values showed significant correlation, $R^2 = 0.96$, ($n = 143$); as did subject and YSI results, $R^2 = 0.94$, ($n = 78$). Two samples were taken both by the subject and the HCP to evaluate precision. The correlation coefficient between subject and HCP values was 98% ($n = 286$ samples) and between subject and YSI values was 97.16% ($n = 156$ samples). CV was 5.9% and 7.2% for subject- and HCP-generated results, respectively. 99% of points fell in the A or B range of the Parkes error grid using YSI as the reference.Surveys were taken after subjects played the game with the meter and game cartridge connected to a Nintendo DS Lite in clinic and in a subset of subjects at home.The majority (61.2%) of patients agreed or

strongly agreed that the combined meter system would motivate them to test their blood sugar more often and that it fulfilled a need in diabetes management (53.3%) to enhance motivation.
Conclusion: An innovative BG meter system with connectivity to a gaming system designed for youth was shown to be clinically accurate and likely able to motivate children to monitor their blood sugar levels more often, a key aspect required for effective T1DM management.

Poster Session II: Diabetes Care, Education, Psychosocial Issues VI

P/122/FRI
HbA1c-values in 38750 Patients with pediatric onset of type-1 diabetes: cross-sectional relationship to demographic variables and longitudinal tracking from diabetes onset to adulthood – results from the German-Austrian multicenter DPV initiative

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Objectives: Metabolic control is a major issue in the longterm care in patients with type-1 diabetes. Only few studies follow patients longitudinally from a pediatric onset of diabetes until adulthood.
Methods: The DPV initiative is based on a computer-software for standardized, prospective documentation of relevant quality indicators for the process and outcome of diabetes care. Data are collected in each treatment center, anonymized and analyzed centrally. Inconsistent data are reported back to the centers for correction. By March 2009, 299 centers (6 Austrian, 293 German) contributed 601319 individual HbA1c measurements in 38750 patients with pediatric diabetes onset (mean age at onset: 8.74 years). The MOM-method was used to mathematically adjust HbA1c-values to the DCCT normal range.
Results: Based on a cross-sectional analysis, the median HbA1c during the most recent year was significantly related to gender (adjusted mean +0.14% in females), age (<5 years: 7.9%, 5–10 years: 7.8%, 10–15 years: 8.1% 15–20 years: 8.4%, >20 years: 7.8%), diabetes duration, migration background as well as various aspects of insulin therapy. Metabolic control improved significantly in the last 14 years (1995: 8.15%, 2008: 7.9%). After adjustment for patient selection, center size and type, an additional 12% of HbA1c variability was accounted for by center heterogeneity. 3520 patients were followed from a pediatric onset of diabetes until adulthood. In patients with diabetes onset <10 years, after adjustment of year of manifestation, gender, migration background, BMI, insulin therapy, diabetes duration and treatment center, HbA1c during the first year was a significant predictor of HbA1c during adulthood ($P < 0.005$), while HbA1c at onset was not ($P = 0.93$).
Conclusions: This extensive study on a large number of pediatric patients with type-1-diabetes confirms relevant demographic variables related to metabolic control, as well as tracking of HbA1c-values over a mean diabetes duration of 10.9 years.

P/123/FRI
Withdrawn by author

P/124/FRI
The effect of severe hypoglycemia and metabolic control on academic skills in children with early onset type 1 diabetes

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Objectives: In children with type 1 diabetes, early onset of illness is associated with cognitive deficits. Also episodes of severe hypoglycemia and poor metabolic control may have an influence on cognitive development, but the previous results have been controversial. Academic skills have been studied less than cognitive functions, although deficient academic skills affect school achievement and future possibilities of the children. This study assesses the effects of early onset diabetes (EOD), severe hypoglycemia (SH) and metabolic control on academic skills.
Methods: The study included 63 children with type 1 diabetes onset before the age of 5 years and 92 control children without diabetes. All the children were 9–10 years of age. Within the diabetes group, 37 had experienced SH (SH+ group) and 26 had avoided SH (SH- group). The mean HbA1c during illness was the measure of metabolic control. The children were assessed with the tasks of reading, spelling and mathematics in the third grade at school. Statistical analyses included ANCOVAS and correlation analysis.
Results: Both groups with EOD performed significantly poorer than the control group in spelling accuracy, and SH- group was significantly poorer than the control group in mathematics. Poorer metabolic control was associated with poorer spelling accuracy. SH was not negatively associated with academic performance.
Conclusions: Early onset of diabetes can adversely affect the development of academic skills. In children with EOD, SH is not associated with deficiency, but poorer metabolic control is associated with less accurate spelling. However, it is possible that diabetes complications may have interactive effects on cognitive development, and it is therefore important to avoid extreme fluctuations of plasma glucose.

P/125/FRI
Social discrimination against young people with diabetes: using the bogardus social distance scale

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This multicentric, non interventional study was carried out to quality the social discrimination faced by young people with diabetes in north and central India. The Bogardus Social Distance Scale, using vignettes based on diabetes, insulin-requiring diabetes and tuberculosis, was used to assess social discrimination in three cohorts: children with diabetes (n = 20; 14 male), first degree relatives (aged >18) of children with diabetes (n = 50; 25 male), and OPD patients, aged >18 years who had no family history of diabetes (n = 50; 25 male). This scale measures social distance on a scale of 1 to 7, with social discrimination being directly proportional to the Bogardus score, and can be modified for any social or clinical situation. An informed verbal consent was taken from all respondents. Children rated the social distance for diabetes

as 1.0 ± 0.0, for insulin requiring diabetes as 1.0 ± 0.0, and for tuberculosis as 1.8 ± 0.63.
Relatives of children with diabetes rated social distance for diabetes as 1.0 ± 0.0, for insulin-requiring diabetes as 1.8 ± 0.64, and for tuberculosis as 2.1 ± 0.74. The control group of OPD patients rated the social distance for diabetes as 1.0 ± 0.0, for insulin-requiring diabetes as 2.1 ± 0.74, and for tuberculosis as 2.3 ± 0.68. All adult respondents were specifically asked to assess the social distance for insulin-requiring boys with diabetes, and insulin-requiring girls with diabetes. The social distance was rated as 1.5 ± 0.53 for boys and 2.3 ± 0.82 for girls by relatives. OPD patients, rated the distance as 2.1 ± 0.74 for boys and 2.5 ± 0.71 for girls.
This exploratory study reveals the high level of social discrimination that insulin-requiring diabetes patients, especially girls, face in a traditional society such as India.

P/126/FRI

The impact and management of type 1 diabetes in the school setting in Italy: a survey of the parents' and teachers' perceptions

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Objectives: This project was born in Italy as an investigation of aspects emerged during the DAWN YOUTH PROJECT. This study was designed to determine – how Italian parents and teachers of 6–13 year-old children with type 1 diabetes manage diabetes during school hours; - the responsibilities and training of school staff regarding diabetes.
Methods: The study was made of a qualitative phase, followed by a quantitative one, conducted through a semi-structured questionnaire filled in by parents of children with diabetes who attend primary or secondary schools and teachers and/or board school staffs of the same types of schools.
Results: A total of 220 parent and 52 teacher questionnaires were completed. For 43.6% parents diabetes had negatively influenced school activities. For 31.9% of elementary school parents and 21.1% of middle school parents there are some difficulties for school staff with diabetes (underestimation, poor knowledge, shirking responsibility, refusal of self-management of children). There is very rarely a nurse present at school for insulin injection (3.6%) or a teacher who will take responsibility for the treatment (2.9%). Most of parents (55.9%) stated that school had no fridge to store Glucagon or that they didn't know if the school was equipped. Few teachers (14.9%) answered they would resort to using Glucagon for an urgency. Only 40.4% of teachers stated that they had received any specific training, in 33.3% by the Diabetic Unit personnel.
Conclusions: Parents' responses reflect insecurity with the care available in school and indentify some problematic areas, like as insulin injection and Glucagon use. Teachers appeared to feel unsure about how to help children in daily management and how to react in case of a serious hypoglycemia. The training of school staff is unusual: both parents and school operators expressed a need for training from qualified diabetes health care professionals.

P/127/FRI

The "Edinburgh Sick Kids High HbA1C policy" – implementation, 1 year outcomes and comparison with a historical control group

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Objectives: To determine whether a formalised policy for managing high HbA1c (>10%) improves glycaemic control.
Methods: A formal policy was introduced in Aug 2007 for all children (≤14 year) whose HbA1c was >10% at a clinic visit. The policy involved a written and agreed management plan at week 0, weekly phone contact, and staff review with repeat HbA1c at 6 & 12 weeks. If HbA1c remained >10%, with <1% decrease from the initial HbA1c, a 5-day hospital admission was arranged. A bespoke computer system was developed to facilitate auditing the policy. HbA1c results were recorded while on policy and for 1 year off policy. Data for patients with high HbA1c prior to initiation of policy was obtained as a historical cohort. No other new policies were introduced within this time period. No patients were exempt from inclusion.
Results: From Aug 2007 until Mar 2009, 39 children had been commenced on the policy and completed 1 year follow-up. Four were admitted. Data for 27 historical controls was obtained for comparison. Compared with the controls, there were no significant difference (SD) in age, gender or time interval between samples for Initial and 1 year HbA1c.
Conclusions: A formalised intervention for children with high HbA1c appears to show significant and sustained improvement in diabetes control at 1 year.
Fig.1 shows the results of all children commenced on the policy. A SD ($P < 0.001$, z = -4.31) was found between the initial and 1 year result in the new policy group and not in the historical cohort ($P = 0.09$, z = -1.694).

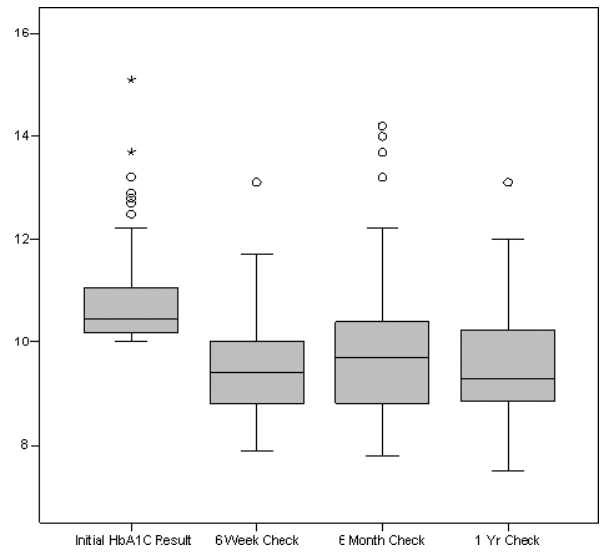

Figure 1. HbA1c (%) at set time points (Median/IQR).

P/128/FRI

The "diabetics" software in adjusting prandial insulin in patients treated with insulin pumps. the results of RCT study

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Objectives: Postprandial hyperglycaemia due to errors made in prandial insulin titrating results in elevated HbA1c and diabetes complications. The aim of the study was to determine whether the "Diabetics" software as a tool in prandial insulin dosing considering carbohydrate (CU) and fat-protein (FPU) units influences postprandial glucose level in patients with type 1 diabetes treated with continuous subcutaneous insulin infusion (CSII).

Methods: This 3-month, randomized, open-label study included 48 children, aged 1–18 years (mean age 11 ± 3.8) from outpatient clinic of the Medical University of Warsaw. Patients were educated in food counting with CU and FPU taken into account in prandial insulin dosing and than subsequently, randomly allocated to the experimental group (GA) which used the "Diabetics" programme and group B (GB) which used caloric tables. The unpaired t-test with Welch correction was used for statistical analysis.

Results: We noticed significant differences in glycaemia profile including pre- and 2-hours post main meals glucose level between groups. The significantly lower postprandial glycaemia values were noted in GA after every main meal: results of post breakfast, lunch and dinner mean glucose level (mg/dl) in GA vs. GB were: 148.0 ± 71.8 vs. 159.5 ± 84.7; $P < 0.0001$; 131.5 ± 68.8 vs. 149.9 ± 83.9; $P < 0.0001$; 132.1 ± 66.7 vs. 158.8 ± 90.8; $P < 0.0001$, respectively. Despite the relevant lower values of postprandial glycaemia, we did not observe statistically significant differences in HbA1c levels and insulin requirement between groups at the end of study (HbA1c 6.78% ± 0.9 in GA and 6.93% ± 0.73 in GB). Moreover, in GA 86.7% of children and parents implement diabetics in daily practices.

Conclusions: Introducing the "Diabetics" and strategy of CU and FPU in prandial insulin dosing results in improving postprandial glucose level in children treated with CSII.

P/129/FRI

Diabetes camps in the phase of transition: adolescents' quality of life, metabolic control and satisfaction with long-term care

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Aims: Satisfaction with diabetes care, quality of life, diabetes-related psychosocial burden and metabolic control of adolescents and young adults were assessed during two German nationwide camps for young people in 2006 and 2008.

Methods: A total of 409 participants of CAMP-D 2006 and 437 participants in 2008 aged 16–25 years. completed psychological questionnaires (WHO-5; PAID; satisfaction with diabetes care (6-point-rating scale with maximum = 1) and measurement of HbA1c (DCA2000+). 129 young people participated in both camps.

Results: Almost all participants were on intensified insulin therapy with proportion of CSII increasing from 37% (2006) to 47% (2008) ($P < 0.01$). At both camps mean HbA1c was 8.3 ± 2.0% (37% / 40% of participants HbA1c <7.5%). Diabetes-related psychosocial stress scored low (PAID total: 19.7 ± 13.6 vs. 22.1 ± 13.7; $P > 0.1$), in contrast overall psychological wellbeing (WHO-5) was poor (mean 14.6 ± 4.6 vs. 14.7 ± 4.7; $P > 0.1$). Multivariate analysis revealed systematic relationships between HbA1c and subjective well-being and diabetes related stress (each $P < 0.05$). All three variables were significantly related to educational level and parents' marital situation (divorced or living together). Diabetes care was assessed positive (score each: 1.8 ± 1.0), psychosocial care (scores 2.6 ± 1.4 / 2.4 ± 1.2) was less satisfying. In 2008, the 129 repeaters reported more motivation in diabetes therapy, better diabetes specific self esteem and less worries about their future as a result of CAMP D 2006.

Conclusion: Despite good equipment and qualified care, only 37% / 40% of the nationwide samples achieved the therapeutic goal of HbA1c <7.5%. In one third of the young people subjective emotional well-being was poor. Correspondingly, the participants mentioned deficits in psychosocial care. A more personalized concept of care that integrates the whole psychosocial situation and burden of young people should be aspired. This multi-professional team concept of pediatric care should be extended to young adulthood.

P/130/FRI

Psychological well-being among youth with diabetes and parents in the dawn youth study

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Objectives: This study assessed the psychosocial and health care factors associated with psychological well-being among young adults with diabetes and parents of children/adolescents with diabetes.

Methods: Data are from internet surveys of independent national samples of: (1) parents (PA) of children/adolescents (age 0–18) with diabetes (N = 4099) and (2) young adults (YA; age 18–25) with diabetes (N = 1905) conducted for the multi-national Diabetes Attitudes, Wishes and Needs (DAWN) Youth Study. Psychological well-being was assessed by the WHO-5 (scores = 0–100). Multiple regression was used to assess the significant ($P < 0.05$) independent associations with WHO-5, controlling for country of residence and demographic and disease characteristics.

Results: Among YA, WHO-5 was higher for respondents who reported greater understanding and support from their health care providers, higher satisfaction with friend support or family support had higher WHO-5. Respondents reporting more successful diabetes-specific coping had higher WHO-5; this association was stronger than other factors in this model. Among PA, WHO-5 was higher for respondents who reported more integrated diabetes care, greater understanding and support from their health care providers, and who participated more in decisions about their child's diabetes care. Respondents reporting higher satisfaction with friend support or work support had higher WHO-5. Respondents reporting more diabetes-specific burden (financial and diabetes management responsibilities), worry about complications and parent-child conflict over diabetes care had lower WHO-5; the association with burden was stronger than other factors in this model.

Conclusions: Many young adults with diabetes and parents of children/adolescents with diabetes have less than optimal psychological well-being. Most of the identified risk factors for

poor well-being are modifiable and suggest promising strategies for improving psychological well-being.

P/131/FRI
Coping mechanisms in adolescents with diabetes

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This multicentric, noninterventional study was done to assess coping mechanisms utilized by adolescents with diabetes, and their correlation with gender, glycemic control and duration of diabetes. A total of 40 adolescents aged 13 to 18 formed the study group, while 84 adults comprised the control. The Cognitive Emotion Regulation Questionnaire (CERQ), 2006 was used to quantify coping mechanisms. This questionnaire assesses 9 different coping mechanisms. Subjects were divided into two groups, one showing above average or higher degree, and the other showing average or lower, of utilization, for each mechanism. The percentage of subjects exhibiting above average or higher degree of each strategy was taken for analysis. Adolescents were more likely to exhibit positive mechanisms such as acceptance (65.00% vs. 47.61%), refocusing (70.00% vs. 47.61%), refocusing on planning (55.00% vs. 36.90%), and reappraisal (65.00% vs. 55.95%). Self blame and other other-blame were much less common in adolescents (5.00% each) than their adult counterparts (40.47% and 22.61%). Significant gender differences were noted in the study cohort. Boys (n = 22) had higher rate of acceptance (81.81% vs. 44.44%).and refocusing on planning (63.63% vs. 44.44%) than girls (n = 18). Other-blame and self blame was noted only in adolescents residing in urban areas, while rumination and catastrophizing were more common in subjects from upper socioeconomic strata. This study highlights the coping mechanisms used by adolescents, and the effect of gender, residence and socioeconomic status in coping. This can help plan individualized programmes for training in coping skills for adolescents with diabetes.

Poster Session I: Diabetes Care, Education, Psychosocial Issues VII

P/132/WED
My Diabetes Playbox: a psychoeducational tool for young children with diabetes

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Objectives: Research has shown that engagement in self-care around disease management needs to begin at an early age. However, a recent study found that young children with Type 1 diabetes have very limited knowledge about their disease (Koller, Daneman, Barrett & Small, in press, 2009). Hence, without adequate knowledge regarding their disease, young children are inhibited from engaging in self-care and medical decision-making from an early age. The purpose of this presentation is to emphasize the significance of providing adequate information regarding diabetes to young children and to present a new and innovative educational resource called: ''My Diabetes Playbox''. This tool is specifically designed to address the learning needs of young children with diabetes while encouraging self-care and emotional expression.
Methods: Following a review of study findings (Koller, Daneman, Barrett & Small, in press, 2009), a team of health care professionals from a large outpatient clinic and an early childhood educator collaborated to design a developmentally appropriate tool for use in educating young children with diabetes.
Results: Three key areas for education were identified. They include: basic knowledge regarding diabetes, issues related to appropriate self-care activities, and emotional and social support.
Conclusions: ''My Diabetes Playbox'' has been designed for use by diabetes educators and parents of children with diabetes. Sample kits will be distributed to a number of clinics across Ontario (ON), Canada. A research study will evaluate the tool from the perspectives of key stakeholders. In addition, ISPAD conference attendees will be asked to provide informal feedback for further refinement of the tool. It is hoped this resource will make a valuable contribution to the area of diabetes education in paediatrics.

P/133/WED
The transfer of the young diabetic from paediatric to adult diabetes service: the role of "Caronte"

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Objectives: The transfer from paediatric to adult diabetes service often results in 29–71% drop-out leading to deterioration of metabolic control and complications (Kipps, Diabet Med, 2002). We report our experience on transferring by a procedure agreed upon the two services involved.
Methods: A total of 22 patients with T1D (14 M, age 21–33 years; median 24.5 years) with duration of disease of 5 to 19 years, were transferred from the paediatric to the diabetic adult clinic. A clinic run by a single diabetologist (IF) and dedicated to the follow-up of young diabetics was set up in the diabetic adult service. As the paediatric service the young adult one was equipped with capillary HbA1c test, software for downloading glucose monitoring machines and computerized clinical records with the whole past clinical history. The task of a paediatric diabetologist (SC), jokingly called ''Caronte'' (*see Dante Alighieri, Divina Commedia*), consisted in the following steps: a) set up the last visit in the paediatric service explaining the transferring procedure, b) introduce the patients to the colleague of the adult service at the first examination, c) check the regular attendance of the patient to the following two appointments, d) evaluate drop-out rate and administer an evaluation questionnaire during the 4th visit. Role of ''Caronte'' was also to contact patients who did not attend the visits for obtaining explanations.
Results: At present, after two years from the start of the project, 22 patients have completed step a) and b), 20 patients have completed step c), 15 patients have completed the phase step d). Three patients dropped out (14%), 2 after the 1st visit and 1 after the 3rd one. Metabolic control didn't change significantly during transfer.
Conclusions: In our experience the role of ''Caronte'' and the availability of a diabetic clinic for young adults are crucial in limiting the drop-out. A final judgment on the reliability of our transfer procedure and patients satisfaction requires the completion of the process.

P/134/WED
Is school a barrier to intensification of insulin therapy in children with type 1 diabetes?

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Objectives: To review the use of insulin therapy in school by children and adolescents with Type 1 Diabetes (T1D) in Tayside and North East Fife, Scotland.

Background: Current guidance (NICE, ISPAD) states that intensive insulin therapy (IIT) be offered to children and young people with T1D. This requires a lunchtime insulin dose. In the UK there is reported resistance to this insulin regimen, particularly for primary school (5–12 years) children.
Methods: We reviewed the number of children in our clinic on IIT and estimated the number of episodes of insulin administration in schools across four education authorities, in the last year. To implement IIT an individualised management protocol is drawn up (as per national guidance*) written jointly by parents, Paediatric Diabetes Specialist Nurses (PSDN) and school staff. The PDSN role is flexible, involving education of school staff using 1 to 1, or group work. Schools delegate staff to perform duties. Emphasis is on communication, reassurance on legal aspects and reducing need for staff to make clinical decisions. Health advice is available from PDSN via phone (office or mobile).
Results: A total of 215 children of 230 (93%, aged 3–18 years) were on IIT (n = 182 MDI; n = 33 CSII) including 67 of 73 (92%) aged 3–12 years (March 2009). The area has 242 schools of which 127 had input from PDSN because of at least 1 child with diabetes. In addition the 9 youngest children attend pre-school nurseries. In the last year there were c.43 000 episodes of insulin administration in a nursery/school setting. There were no adverse events.
Conclusion: With a detailed, individualised education and support programme for parents, pupils and school staff, IIT (MDI or CSII) can be delivered successfully and safely in schools, with no extra health staff on site. National Guidelines assist in policy implementation. Over the next year we intend to assess how insulin is administered in schools in detail.
*Administration of Medicines in Schools Scottish Executive 2001.

P/135/WED

The persistence of mood and posttraumatic stress disorders among mothers of diabetic children and its impact on their children's glycemic control: results of a pilot prospective follow-up study

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Objective: Mood and posttraumatic stress disorders (PTSD) have often been reported among parents of diabetic children affecting their children's glycemic control. Aim of this study was to investigate the presence and persistence of depression, anxiety and PTSD among mothers of diabetic children and their impact on their children's diabetes.
Methods: The sample consisted of 123 children (54 boys), aged 10.9 ± 4.2 years, 51 newly diagnosed, 72 with long-standing diabetes, all followed at the Diabetes Center of the First Department of Pediatrics of Athens University. The mothers' mean age was 37.9 ± 6.6 years. Questionnaires used were the 17-item PTDS scale, the Beck Depression Inventory (BDI), the Spielberger's modified Greek state-trait anxiety inventory (STAI) and a Major Life Events one. Mothers of long-standing diabetics filled the questionnaires once; mothers of newly diagnosed ones filled them 1 and 6 months after diagnosis.
Results: State, depression and PTSD were significantly and positively inter-correlated (correlation coefficients from 0.37 to 0.67, $P < 0.001$), indicating that greater PTSD levels are accompanied with greater levels of depression and anxiety. A significant negative correlation was found between PTSD and BDI scales with mothers' age (r = -0.22, $P = 0.023$ and r = −0.20, $P = 0.038$, respectively), suggesting that younger mothers had more severe impairments. A significant negative correlation was found between PTSD and duration of disease (r = −0.23, $P = 0.046$), indicating that mothers of newly diagnosed children had more PTSD. On follow-up of newly diagnosed diabetics, HbAIc reduction from baseline to 6 months was significantly correlated with state (r = 0.69, $P = 0.028$) and PTSD (r = 0.75, $P = 0.012$) at 6 months, indicating that better glycemic control is associated with reduction of psychological burden.
Conclusions: Depression, anxiety and PTSD are frequent among mothers of diabetic children, may persist over time aggravating their children's glycemic control.

P/136/WED

Predicting health and functional outcome from psychological functioning at diagnosis with type 1 diabetes

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Objectives: Caring for youth with type 1 diabetes by minimizing psychosocial morbidity can be facilitated by early identification of those at highest risk of poor psychosocial and metabolic outcomes.
Method: Participants: 123 (mean age 8.3) children recruited at T1DM onset. 106 (mean age 20.5) were reassessed 12 years later. Baseline measures: Parent-reported measures of family function (FACES), parental psychopathology (GHQ), child temperament (EAS) and child behaviour and emotional well-being (CBCL). Follow-up measures: Self-reported current psychological function (YSR/YASR), psychological distress (K6), and neurotic personality (EPQ).
Results: Poor family cohesion was associated with increased anxiety, withdrawal, thought problems and overall internalising problems ($P = 0.000$) 12 years post diagnosis. Reduced family adaptability was related to aggression ($P = 0.041$). There was a strong relationship between behaviour problems at baseline and psychological symptoms at 12 years – internalising, externalising, aggression, anxiety, withdrawal, somatic concerns ($P = 0.000$), attention, delinquency and thought problems ($P < 0.05$). High emotionality of the child at diagnosis predicted externalising behaviour problems at follow-up. There were no significant direct associations between child temperament or psychological functioning, parental psychopathology or family functioning at diagnosis, and subsequent metabolic control. There was a trend ($P = 0.057$) for those who reported a referral to mental health services to have a poorer metabolic control history.
Conclusion: Behaviour problems and lower family cohesion at diagnosis were associated with poor psychosocial outcome. The trend for those requiring mental health services to have poorer metabolic control suggests an indirect relationship between psychological status at diagnosis and health outcome. The established relationship with hospital care provides the perfect opportunity for intervention with children and families at risk.

P/137/WED

5 mm needles in children and adolescents are remarkably well tolerated, reliably inject into subcutaneous fat and have minimal leakage at doses up to 60 Units

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Objectives: Inadvertent intramuscular (IM) injections of insulin in children and adolescents are common and cause variability in

glycaemic control. While shorter needles reduce IM injections, concerns about dermal injections and insulin leakage have been raised. The aim of this study was to assess the injection technique most reliably delivering insulin into subcutaneous (SC) fat using NovoFine® 5mm 32G needles.
Methods: Subjects had 8 injections of air (200 ml); 4 into the lateral thigh and 4 into the abdomen using either angled or vertical insertion and using either a pinched skinfold or no skinfold. Immediately after each injection an assessment of injection depth was made by ultrasonography. At a separate visit 20, 40 or 60 units of test medium were injected using the same techniques into the thigh and abdomen. Leakage was assessed by blotting the injection site and weighing filter paper.
Results: A total of 117 children (age 6–19 years, 52% male, BMI 14.4–38.3) were recruited. The least IM injections occurred in pinched angled abdominal injections (2%) and the highest in unpinched vertical thigh injections (12%). IM injections were associated with reduced SC fat thickness ($P < 0.0001$), BMI ($P < 0.0001$) and male gender ($P < 0.001$). There was only one dermal injection. No clear preference for injection technique was shown, although the abdominal site was preferred over the thigh ($P = 0.01$). The overall pain score was compared to a previous study (n = 56) using 6 and 8 mm needles. The 5 mm needles were much less painful (1.51 ± 0.5 cm vs. 2.51 ± 1.2 cm and 2.85 ± 1.6 cm for 6 and 8 mm needles respectively, $P < 0.001$). Leakage studies using 20U (n = 102), 40U (n = 25) and 60U (n = 45) of test medium showed similar and minimal loss equating to less than 0.5U of insulin.
Conclusions: Angled insertion and pinched skinfold minimizes the risk of IM injections. NovoFine® 5 mm needles were much less painful than longer needles and we recommend this length in all children for insulin administration.

P/138/WED
Does parental perception of their child's quality of life and diabetes knowledge matter in relation to improving glycaemic control?

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Objectives: The purpose of this study is to evaluate the difference between self assessed diabetes-specific QOL scores in children and young adults when compared to parents. To ascertain the relationship between parental knowledge of diabetes and glycaemic control in children.
Methods: A total of 100 children and young adults aged 2–17 years, with type 1 diabetes and their parents were handed validated diabetes specific-PedsQL 3.0 questionnaires.Hba1c was used as an indicator of glycaemic control. Parents of 48 participants completed the Modified ADKnowl [Audit of Diabetes Knowledge] questionnaire.
Results: Mean HbA1c levels were 9.5 + 1.68%. The lowest mean PedsQL scores were found in the 5–7-year old age group. Parental scores were significantly lower ($P < 0.01$) compared to their child's. Fathers produced higher mean scores compared to mothers. Both children and parents describe ''going low'' as the most worrisome symptom. ''Sticking to the diabetes plan'' and needle related pain has been rated as hurdles faced by children in the treatment barrier scale. Mothers rate ''tracking carbohydrates'' and ''taking insulin injections'' as problematic in treatment adherence. No relationship was found between parental knowledge scores and their level of education. Glycaemic control in children was not related to the education level of the parents. Index of multiple deprivation scores in this population did not show any effect on quality of life.
Conclusions: Diabetes related QOL was lower in parents of children with diabetes compared to their children. Parental knowledge of self management of diabetes is solely not enough. Interventions aiming to improve outcomes in this population should not only focus on disease related outcomes but also on coping strategies for the family.

P/139/WED
A systematic, nationwide study of diabetes team resources in paediatric departments

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Aims: To assess the multidisciplinary resources allocated to different paediatric departments treating diabetes in Norway and the relation to key clinical outcome data. In 2007 The Norwegian Diabetes Association recommended per 100 children: 1 full time diabetes nurse educators, 1 fulltime consultant, one half-time dietician, psychologist in 40% position and social worker in 20% position.
Methods: Norway has a national surveillance childhood diabetes registry. Each year all patients perform a systematic examination according to WHO Basic Information Sheet. In 2007, 1853 patients from all 26 departments participated, comprising more then 85% of all patients in the country. HbA1c was measured in one central laboratory for all patients. In a special data entry sheet was registered: 1) number of different professions in each diabetes team, 2) how the team was organized, 3) number of children treated. To secure the quality the data sheets were followed up with a phone interview.
Results: A general nationwide deficit in resources was detected. 11/26 departments had ≥100 children with diabetes. Only 36% (4/11) of these hospitals had a multidisciplinary diabetes team. 15/26 departments had < 100 children with diabetes. 53% (8/15) of these hospitals had a diabetes team. A great variation in staffing was detected: 4 (15%) departments had no dietician, 11 (42%) had no psychologist, 7 (27%) had no social worker. Only 12/26 (46%) of the departments had a multidisciplinary diabetes team according to the recommendation. Mean HbA1c from all hospitals was 8.4% (Hospital range 7.8–8.9%). Only 33% of the patients reach the HbA1c target of 7.5%. However no significant difference in HbA1c was found whether the centres has a defined diabetes team or not.
Conclusions: Less than half of the paediatric departments had multidisciplinary diabetes team as recommended. Lack of resources may contribute to that only one third of the patients reach treatment goals of blood glucose control.

P/140/WED
''Check Your Health'' test of an instrument that measures perceived health, quality of life and burden of diabetes in young people with diabetes

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One purpose with diabetes care in young people with diabetes is, referring to ISPAD Consensus Guidelines 2007, to optimize health and quality of life (QoL). Those Guidelines do also recommend that: ''assessment of developmental progress in all domains of QoL should be conducted on a routine basis''.
Objectives: The aim of this study was to test part 1 of the instrument ''Check your health'' for reliability and validity in

teenagers with diabetes. Part 1 measures "self-reported health" and "burden of diabetes", while part 2 measures self-care and empowerment. The instrument is constructed as vertical thermometer scales, and is fast and easy to complete.

Methods: A convenience sample of 204 teenagers, 12–17 years of age, completed the questionnaires "Check your health" and DisabKids when visiting the diabetes clinic. Forty-seven of 199 completed the questionnaires at home a second time, and mailed it to the researcher.

Results: In the reliability test, the correlation between test and retest was found to be satisfactory (0.94–0.62, except for social burden, 0.41). Convergent validity was found to be moderate (0.62–0.38), while the instrument showed good discriminant validity, according to gender, metabolic control and disease severity. The domain burden of diabetes turned out to be very sensitive.

Conclusions: This study revealed that the first part of the instrument "Check your health" showed clinical utility in teenagers with diabetes. The reliability and validity tests of the measure showed promising results in Swedish teenagers, and it can probably be used in clinical settings. According to our results and earlier studies one has to consider if the domain social burden should be withdrawn. To further strengthen the convergent validity, it should be compared to other QoL instruments, and to obtain normative values, it has to be used in a larger context.

Keywords: Type 1 diabetes, adolescence, quality of life, health, burden of diabetes.

P/141/WED

Diabetes UK, ACDC, BSPED and ABCD survey of specialist paediatric and adolescent diabetes services in the UK in 2008

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Aims: To assess the provision of paediatric and adolescent diabetes services in the UK and to compare changes in service delivery since 2002.

Methods: Questionnaires were sent to the lead paediatric consultant from all identifiable UK paediatric and adolescent diabetes services (n = 205). Questions were based on National Institute for Health and Clinical Excellence (NICE) and Scottish Intercollegiate Guidelines (SIGN) recommendations for diabetes care in childhood. Results were analysed using parametric and non-parametric tests and the framework approach for qualitative data.

Results: 129 services (63%) returned questionnaires involving 220 clinics. Of these 70% offer newly diagnosed children and young people with Type 1 DM a structured education programme. 95% provide timely and ongoing opportunities to access information about the development, management and effects of diabetes. 75% always ensure HbA_{1c} measurements are available at outpatient clinics compared to 86% in 2002. All services offer multiple daily injection regimens. 78% of services support insulin pump therapy, of which 78% have a trained specialist team with, on average, 5 patients on a pump (median, range 0–69). 99% of services screen for microalbuminuria and 100% screen for retinopathy compared to 83% and 80% in 2002 respectively. Only 21% of clinics have a psychological professional as an integrated member of the diabetes team, compared to 20% in 2002. Services described lack of resources to provide education, psychological support, dietetic, nursing and medical time.

Conclusion: Paediatric and adolescent diabetes services are challenged to provide high quality care in the context of rising prevalence and increasingly complex insulin regimes. The increased use of pumps will have implications for adult service provision. Services have improved delivery in screening for complications but the problem of inadequate psychological support remains.

Poster Session II: Diabetes Epidemiology I

P/142/FRI

The outcomes of cohorts in Japanese study group of insulin therapy for childhood and adolescent diabetes: the assessment by HbA1c standardization with JDS master calibrators

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Objective: Since the Japanese Study Group of Insulin Therapy for Childhood and Adolescent Diabetes (JSGITCA) has standardized HbA1c numbers by JDS (Japan Diabetes Society) Master Calibrators, we evaluated the changes of glycemic controls in our cohorts.

Methods: In T1DM patients under 18-year old enrolled as the 2nd and 3rd cohorts in 2000 and 2008, respectively, A1C in 2nd cohort was examined every 4 months. JDS Master Calibrators have also IFCC A1C numbers. The A1C raw data at SRL were evaluated and confirmed for standardizing accuracy by JDS certified numbers in each period. In every season 4 patients' samples were measured at SRL and each institute. The validity of each institute measurement was estimated by the absolute relative difference (ARD). At the entry for 3rd cohort in 2008, A1C and GA values were measured in patients and their non-diabetic family members.

Results: (1) The average ARD of 23 times tests was 2.96 (0.26) % (mean, SD), so that the measurement in each institute was well standardized. (2) In the patients with their duration of 5 years or more, A1C decreased in springs of 2002, 2006, 2008 in each years-old group: 8–9 year old, 12–13 year old, 15–16 year old, as follows: ex. the mean A1C in 12–13 year old, was significantly decreased between 2002 and 2008, 8.07 (67.1) and 7.60 (62.2) in JDS% (IFCC mmol/mol) numbers, respectively ($P = 0.033$). (3) The mean A1C values as JDS% (IFCC mmol/mol) number were 8.10 (67.4) in spring, 8.01 (66.4) in summer and 8.18 (68.2) in winter ($P < 0.005$). (4) The GA/A1C ratio was 3.2 (3.0–3.4) (50 (25–75) %ile) in T1DM, significantly higher than 2.8 (2.7–2.9) in family members. (5) In T1DM, GA showed a positive correlation with A1C [$A1C = 2.381 + 0.212 \times GA$ ($P < 0.0001$, $R^2 = 0.0864$)].

Conclusions: We were able to show the improvement in A1C in Japanese T1DM patients with seasonal changes in A1C value. The simultaneous measurements of GA and A1C may be useful to assess the degree of glycemic excursion and the trend in changes of glycemic controls.

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Type 1 diabetes mellitus: glycemic control and complications in Turkish children and adolescents

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Aim: To progress in the formation of a diabetes registry system and to assess metabolic control, accompanying autoimmune disease, chronic and acute complications of type 1 diabetic children in Turkey a cross sectional, multi central study was designed.

Material and methods: Metabolic control and complications were described according to ISPAD consensus guidelines in children and adolescents who were followed up in the year of 2007–2008.

Results: A total of 1032 type 1 diabetic children (50.5% female, 49.5% male) with a mean age of 12.5 ± 4.1 years and a mean duration of diabetes of 4.7 ± 3.2 years were included. 32.1% of the patients were prepubertal. When patients were grouped in 5 year age intervals according to age at diagnosis; 27.2% were between 0–4.99 years, 42.5% were between 5 to 9.99 years and 27.9% were between 10 to 14.99 years and the rest was between 15 to 20 years. Mean HbA1c of the patients in the preceding year was 8.4 ± 1.6%. 30.5% of the patients' HbA1c was <7.5, 32.6% was between 7.5 and 9%, and 36.9% was >9%. 2.6% of the patients had neuropathy, 1.4% had retinopathy, 5.4% had persistent microalbuminuria and 0.3% had diabetic nephropathy. Mean duration of diabetes and age of the patients with neuropathy, retinopathy and nephropathy was significantly different than the patients without complications ($P < 0.01$). Persistent microalbuminuria and neuropathy was more frequent in pubertal children than prepubertal children ($P = 0.02$ and 0.00). Twelve percent of the patients had chronic lymphocytic thyroiditis, 0.1% graves and 4.3% had celiac disease.5.2% of the patients had ketoacidosis and 4.9% had severe hypoglycemia in the preceding year.

Conclusion: One of the primary management goals in diabetes care is to improve glycemic control, thereby limiting complications and chronic conditions that arise secondary to the diabetes. Although majority of the patients were using insulin analogues poor glycemic control was common and chronic complications were seen.

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Ketoacidosis in the diagnosis of type 1 diabetes mellitus in Spain

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Objetives: To identify the frequency and characteristics of ketoacidosis (DKA) at onset of diabetes in children from 0 to 15 years of age between 2004 and 2008 at 11 paediatric diabetes units.

Material and methods: Retrospective collection of data from case reports on 1169 children (632 M/537 F) presenting diabetes between 01/01/2004 and 31/12/2008. Mean age on diagnosis: 8 years (range 0.3–15). By age groups: 0-5 years, 25.7%; 5-10 years, 46.2%; 10-15 years 28.1%.DKA as presenting symptom is analyzed by age groups, gender, age at onset, severity of DKA (ISPAD Consensus 2006–2007) and presence of complications.

Statistical methods: chi-square, t-test, Anova.

Results: An increase is noted in the number of onsets of diabetes in the course of the study (5%). DKA at onset in 39.5%, without significant differences in the course of the study.The mean age of those presenting DKA is significantly lower (7.4 ± 4.1 years of age, $P < 0.001$). DKA in those under 5 years of age is 51.7%, significantly greater than in the rest of the age groups ($P < 0.01$), outstandingly so in those under 2 years of age (69%). Classification of DKA (mild, moderate and severe) by age groups (<5 years/>5 years), there is not significant differences ($P > 0.05$). There has been no mortality and 3 related severe complications were reported (1 cerebral oedema, 1 cerebral infarction and 1 femoral vein thrombosis)

Conclusions: Type 1 diabetes continues to increase and the debut with DKA is still very high in both number and severity. Following the recommendations of the ISPAD, since January, 2009, this Committee has been implementing the DKA prevention programme at health centres, hospitals, schools and pharmacies. Its results will be the subject of a forthcoming paper by this Committee.

P/145/FRI

Prevalence of type 1 diabetes mellitus in children and adolescents in Germany

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Objectives: Aim was to provide updated estimates on the prevalence of type 1 diabetes based on the diabetes incicence register of North Rhine-Westphalia (NRW), the most populous German federal state.

Methods: Since 1996 newly diagnosed cases of Type 1 diabetes have been ascertained with the North Rhine-Westphalian

diabetes register by means of three data sources, the prospective hospital-based active surveillance system ESPED, annual inquiries among medical practices, and the computer-based documentation system DPV founded for quality control and scientific research in paediatric diabetes care. Completeness of ascertainment was estimated by the capture-recapture-method. Point and interval estimates (95%-CI) of prevalences (per 100 000 persons) were based on Poisson distribution. Age- and sex-standardized prevalences were estimated by the direct method. The effects of sex and age were assessed by Poisson regression analysis.

Results: On 31.12.2007, 3946 and 6881 children and adolescents with type 1 diabetes 0–14 or 0–19 years of age, respectively, were registerd in NRW. The completeness of ascertainment was estimated to be 98.6% (98.3–98.8%) and 98.1% (97.8–98.3%). Prevalence estimates were 145.8 (141.3–150.4) and 184.3 (179.9–188.7), respectively. Prevalences among boy and girls 0–14-years old were quite similar (145.2 vs. 146.5, $P = 0.799$), a significant male preponderance was observed in the age group 15–19 years (292.0 vs. 260.7, $P = 0.002$). Prevalences in the age groups 0–4, 5–9, 10–14, and 15–19 years were 34.2, 140.3, 248.1, and 276.7. In Germany, there are approximately 16 400–17 400 (29 700–31 200) children and adolescents with type 1 diabetes in the age group 0–14 (0–19).

Conclusions: At present, about 15 (19) out of 10 000 children and adolescents in the age group 0–14 (0–19) have type 1 diabetes. Up to date diabetes prevalence estimates are a basic requirement for the planning of public health resources of diabetes care.

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Frequency of type 1 diabetes mellitus in children and adolescence in Ukraine

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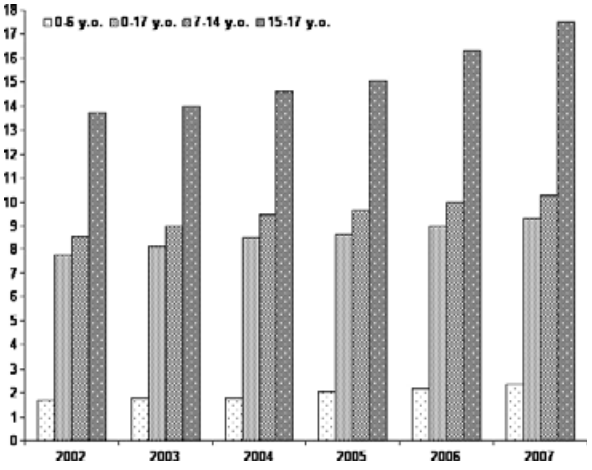
Objectives: To determine a frequency of Type 1 Diabetes Mellitus (T1DM) in children of different age groups as a part the tendency of this state in the European countries.

Materials and methods: Target group: children 0–17 year old. Methodology for selection: official statistical information on the T1DM frequency in children in Ukraine during 2002–2007.

Results and conclusions: Approximately 1 child per 1000 children (0–17 years old) has T1DM. During the analysis of different geographical areas of Ukraine the phenomenon of west-east ''gradient'' was discovered. The frequency of T1DM per 10 000 is highest in eastern region and lowest in western region. In Ukraine 7932 children 0–17 year old with T1DM were registered in 2007. The greatest tendency of frequency growth can be noticed in children 0–6 year old, that shows a trend toward earlier age of onset.The frequency increases by 7% yearly on average (from 1.1% in 2003 to 13.3% in 2005).

Also T1DM frequency raised in the age group 15–17 year old by 5% annually (from 1.7% in 2003 to 8.3% in 2006). Frequency growth in 7–14 year old group and in a general group 0–17 remains stable and increases only by 4% annually. The lowest frequency of DM1 was determined in between 2003–2004. Because Ukraine is 5th in population in Europe the rise in T1DM suggests that the European population in general is experiencing an increase in T1DM.



[T1DM frequency]

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Epidemiology of DKA in children and adolescents in Moscow, 1996–2006

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Diabetic ketoacidosis (DKA) is the major cause of morbidity and mortality in children with T1D. The challenge of urgent conditions, regardless of how much time has passed since T1D was diagnosed, is of great importance in Moscow region. The aim of this study was to analyze the amount of children and adolescents suffering from T1D and DKA in all severity degrees and stages of T1D. Data were collected by Statistics Office of Moscow City Healthcare Department. Incidence and prevalence of T1D and DKA in children of Moscow region were analyzed. The incidence of T1D in Moscow is rising, and slowly rising is the trend towards manifestation of T1D through DKA. The rising trend in the amount of children and adolescents suffering from T1D is less sharp than the trend of rising in manifestations of T1D through DKA. The average annual amount of new-onset T1D is 93 ± 14.5 children (5.1 ± 0.77% of T1D patient 0–18 years). Average incidence of DKA is 50.6 ± 7.7 per 1000 T1D patients 0–18 years per year and 232.2 ± 31.9 per 1000 children and adolescents with new-onset T1D per year. Among the patients with diagnosed T1D, 20.4 ± 6.5 DKA cases are being reported each year. The number of children and adolescents suffering from DKA has changed recently: from 72.75 ± 5.9 (50.5 ± 7.9 - 6.4% of them - were new-onset T1D patients) in 1996–1999 and 90.5 ± 8.1 (54 ± 12.1 - 59.7% new-onset) in 1999–2004 to 123.7 ± 20.5 (64.3 ± 14.7 - 52%) new-onset in 2004–2006. Average percentage of children and adolescents manifesting T1D through DKA is 61.4 ± 8.2%.Average annual rise of DKA incidence (per 1000 children and adolescents with T1D) is 6 ± 1.1%.There is no significant increase in DKA incidence in both new-onset (5 ± 11%) and diagnosed T1D (4 ± 16%),calculated per 1000 patients per year. Annual increase of DKA incidence in children and adolescents per 1000 patients per year is shown. Most of new-onset patients are being taken to the hospital in DKA, so it's necessary to increase awareness of T1D in children, parents and doctors.

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Retrospective epidemiological study of patients attended the pediatric outpatient clinic of national institute of diabetes & endocrinology, Cairo, Egypt

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The aim of this work was to do a retrospective epidemiological study of the records of diabetic children attended the outpatient pediatric clinic in NIDE. The files 0f 851 diabetic children were examined retrospectively without any reference to the personal data. Out of them, the files of 200 diabetic patients were also studied for determination of chronic management results represented by the type of insulin regimen used and estimation of the daily insulin dose per kg. We also assessed the outcome management of acute ketoacidosis from the files of 200 patients admitted to the ICU & inpatient departments. The results showed that there is no statistical differences between male, (n = 424) to female, (n = 427) distribution. The results of this retrospective study showed that the mean age of onset of diabetes in children attended the outpatient pediatric clinic of National Institute of Diabetes was (mean = 8.37 ± 10.96 years). The present study showed also that there was a decrease of age of onset of diabetes among diabetic children as the age of onset between 5 and < 10 years were the highest percentage (46%). As regards the insulin regimen used by the diabetic children, 17.5% used conventional insulin therapy, 11% used modified insulin therapy as they used regular insulin before lunch, and 71.5% used basal-bolus insulin regimen. The mean percentage of insulin unites per kg was 1.00 ± 0.38 U/kg/day. The mean BMI was = 24.54 ± 6.42, while the BMI distribution was: 56% were with normal weight ≤ 25, 27% were overweight = 25 : < 30, 14% were obese = 30 : < 40 and only 3% were with severe obesity where BMI ≥ 40. The study of control of diabetes showed that the glycated HbA1c was < 7% in 31%, 7–8% in 22%, > 8–9% in 14% and > 9% in 33%. The above results showed also that 13.0% of ketotic cases were with severe acidosis, 7.7% were with moderate acidosis, and 32.4% were with mild acidosis.

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The frequency of celiac disease in children and adolescents with type 1 diabetes mellitus

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Objective: Type 1 diabetes mellitus (T1DM) is associated with celiac disease (CD). The aim of the study was to evaluate the frequency for CD in our patients with T1DM.

Methods: Six hundred T1DM children were enrolled to the study. The presence of CD was screened with IgA endomysial antibodies (EMA), and IgA and IgG antigliadin antibodies (AGA) test. Duodenal biopsy was performed to confirm CD.

Results: Seven patients (2 male, 5 female) were diagnosed CD. The duration of diabetes was 76.5 ± 79.7 months and CD was 49.5 ± 37 months. At the diagnosis of CD patients had suffered from malnutrition (n : 5), failure the thrive (n : 3), diarrhea (n : 4), abdominal distension (n : 4), anemia (n : 2) and hypoglycemia (n : 1). Weights of the patients before and after gluten-free diet (GFD) were 24.2 ± 10 kg and 38 ± 15 kg. Heights of the patients before and after GFD were 118.7 ± 24 cm and 137.9 ± 20 cm. EMA was positive all patients. AGA IgA and IgG were positive in five patients. Duodenal biopsy of the patients showed intraepithelial lymphocytosis, villous atrophy, crypt hypertrophy and increased chronic inflammatory cells in the lamina propria. HbA1c of the patients before and after GFD were 9.5 ± 2.9% and 8.9 ± 2.8%. Daily insulin doses were increased after GFD (0.78 ± 0.3 IU, 0.95 ± 0.3, respectively).

Conclusion: Screening for CD is performed particularly in patients suffered from diarrhea, short stature and malnutrition in T1DM population.

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Seasonality of birth date, onset and autoinmunity of children and adolescents with type 1 diabetes mellitus

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Different studies have reported a seasonal pattern in type 1 Diabetes Mellitus (T1DM) showing the lowest incidence during the warmer months and the highest incidence during the winter.

Aims: To establish in a cohort of children and adolescents with T1DM the relationship between birth season and the frequency of diabetes as well as the correspondence between seasonal variation and elevated titles of antibodies respect to the onset of T1DM.

Methods: We analyzed the birth dates and the onset of 558 Caucasian pediatric subjects with T1DM in relation with the distribution of seasons (spring, summer, autumn and winter). Likewise, multiple comparisons were performed by ANOVA test modified by Bonferroni regarding seasonality at diagnosis and the onset and the positivity of glutamate decarboxylase autoantibody (GAD), anti-tyrosine-phosphatase (IA-2) and β-cell-specific autoantibodies to insulin (IAA) in patients where antibodies determination at onset was available (n = 406).

Results: The distribution of cases of onset diabetes in our population is similar in each of the seasons groups, as well as the distribution obtained under the period of birth of these children. There were no statistically significant differences between seasons, either global or detailed. Statistically significant differences regarding the time of the seasonal onset and positivity of antibodies were not present.

Conclusions: The pattern of seasonal fluctuations of diabetes was not observed in epidemiological data of our sample. Knowing the usual seasonal fluctuations and the peak incidence of T1DM in the periods of autumn and winter, our study contrasts with those argumenting these facts.

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Mortality caused by DKA in children and adolescents of Moscow, 1964–2008

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Diabetic ketoacidosis (DKA) is the major cause of morbidity and mortality in children with T1D.The challenge of urgent conditions, regardless of how much time has passed since T1D was diagnosed, is of great importance in Moscow region. The aim of this study was to analyze lethality in children and adolescents with diagnosed T1D in 1996–2006/ Data were collected by Statistics Office of Moscow City Healthcare. Incidence and lethality rate in patients with T1D were analyzed. The data were treated with Gaussian

statistics. Mortality in children with T1D in Moscow in 1996–2005 was 0.12 per 100 000 children, and the only cause of their deaths was DKA. The mortality rate is 0.1 ± 0.05% per year. According to the latest Consensus Guidelines, mortality of 0.15–0.3% is acceptable. In Moscow we have less lethal cases. The endocrinology department of Morozovskaya Children City Clinical hospital was established in 1964. The department is the center for urgent endocrinology in Moscow. Up to 01.01.09, 15 963 patients were treated in the department, 2586 of who were suffering from DKA (16.2% from all the T1D patients of our department). Pitifully, 109 of them died (4.2%). Approximately 92% of all DKA cases in Moscow become patients of our department (93.5% of DKA in new-onset patients). Since 1976 we implement the methodic of DKA treatment, developed by our doctors and based on the huge experience we have. The share of lethal cases in overall amount of treated DKA cases is going down since the department was established: 26.9 ± 12.8% in 1964–1976, 4.5 ± 0.8% (6-fold decrease) in 1977–1989 and 2.3 ± 1.2% (another 2-fold decrease) in 1990–2008. The amount of lethal cases did not change significantly, but the amount of treated cases increased. Mortality in DKA cases remains a challenge of modern endocrinology. To reduce mortality we should try to avoid DKA and at the same time improve schemes of DKA treatment, and in both of these fields further studies are needed.

Poster Session I: Diabetes Epidemiology II

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Extended family history of type 1 diabetes and its effects on genotype and phenotype of children with newly diagnosed type 1 diabetes

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Objective: To determine the prevalence of type 1 diabetes (T1D) in 1st and 2nd degree relatives of children with newly diagnosed T1D and to characterize the effects of a positive family history on the HLA genotype, signs of beta-cell autoimmunity and clinical markers in the index case.

Methods: A total of 1488 children with T1D diagnosed under the age of 15 years (median 8.2 year, 57% male) were included from the Finnish Pediatric Diabetes Register. Data on family history of T1D and metabolic decompensation at diagnosis was collected using a structured questionnaire. Antibodies to beta-cell antigens (GADA, IAA, IA-2A, ICA) and HLA genotypes were analyzed.

Results: 12.2% of subjects had a 1st degree relative with T1D (father 6.2%, mother 3.2%, sibling 4.8%) and 12.0% an affected 2nd degree relative (6.0% from the paternal side, 6.5% from the maternal). The fathers of children with a positive family history for T1D carried a stronger HLA-conferred susceptibility ($P < 0.001$). There were no differences in the signs of beta-cell autoimmunity between familial and non-familial cases. Children without T1D in their relatives had a longer duration of symptoms before diagnosis ($P = 0.011$) and more often impaired consciousness at diagnosis ($P = 0.037$) than those with an affected relative. In addition the former had higher blood glucose ($P < 0.001$) and beta-OH-butyrate levels ($P < 0.001$). They had also lower pH ($P < 0.001$) and more often ketoacidosis ($P < 0.001$) at diagnosis.

Conclusions: In accord with previous findings T1D was about two times more common among fathers than mothers. The proportion of index cases with an affected 2nd degree relative was similar to that of children with an affected 1st degree relative. The higher proportion of risk HLA genotypes in fathers of children with a positive family history for T1D indicates that paternal HLA genotypes contribute to the familial clustering of T1D. A positive family history for T1D was associated with a milder metabolic decompensation at diagnosis.

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Type 1 diabetes in a population-based cohort of Italian twin

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Objectives: Estimate in the Italian population: (1) T1DM concordance in monozygotic (MZ) and dizygotic (DZ) twins; (2) in concordant pairs, recurrence risk ratio and disease discordance time; (3) genetic and environmental components of susceptibility variance to T1DM.

Methods: Twins were identified by a record linkage between the Italian Twin Registry and a list of 10 701 T1DM patients, provided by 34 Centres, affiliated to the Italian Study Group on Diabetes of ISPED. Of the 124 T1DM twins so far identified, 70 (in 60 pairs and 1 triplet) have already been enrolled. They are 31 males and 39 females, median age at diagnosis is 7.0 years (range 1–20 years). Zigosity in same sex pairs has been assigned by standardized questionnaire on physical resemblance: 18 are MZ and 44 DZ (including 2 pairs from the triplet). Saliva for genetic studies and DNA bio-banking has been so far collected from 54 pairs.

Results: Six MZ and 3 DZ pairs were concordant. Probandwise concordances were 50.0% (95% CI 25.5–74.5) in MZ and 12.8% (0–25.8) in DZ pairs ($P = 0.008$). Disease recurrence risk was 4 times higher in MZ than in DZ co-twins. In concordant pairs, the second twins developed T1DM within a time range of 34 days - 5.2 years (median 1.1 years) if MZ, and of 0 days – 7 years (median 4.7 years) if DZ. In discordant pairs, median follow up times are 4.5 years (range: 0.4–19.0 years) for MZ and 6.3 years (0.2–31.8 years) for DZ unaffected co-twins. Twins diagnosed before 3 years had a higher mean birth weight than their unaffected co-twins (2539 g vs. 2369 g, $P = 0.4$). Tetrachoric correlations were 0.83 (0.65–0.94) for MZ and 0.49 (0.26–0.68) for DZ pairs. Under an ACE model, heritability (A) was estimated at 0.67 (0.16–0.93), while contributions of familial (C) and individual-specific (E) environmental effects were 0.16 (0–0.56) and 0.17 (0.06–0.35), respectively.

Conclusions: This study confirms substantial genetic contribution to T1DM susceptibility, as already observed in Finnish and Danish populations.

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Accelerated beta-cell destruction in preschool age children with type 1 diabetes mellitus

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Background: Partial remission (PR) of type 1 diabetes mellitus (T1DM) is characterized by reduced insulin requirements while maintaining good glycemic control. The rate of PR has been observed to be lower in preschool vs older children. We postulate

that this observation is due to accelerated beta-cell destruction in this group.
Objective: To compare the course of T1DM in young children to that of older children.
Design/methods: All new onset TIDM children presenting to the Children's Hospital of Philadelphia from December 2002 to December 2007 were assessed for islet cell antibodies [insulin (IAA), glutamic acid decarboxylase (GAD), insulinoma antigen (IA2)] and biochemical markers of disease severity (c-peptide, pH, bicarbonate and HbA1c) at the time of T1DM diagnosis. Comparison was made between preschool-age (< 5 years) and older (5–18 years) children. HbA1c and insulin total daily dose (TDD) at 6, 12, 18 and 24-months of diagnosis were analyzed, with PR defined as TDD < 0.5 units/kg/d and HbA1c < 8%.
Results: Of 688 T1DM patients, the 130 preschool age children had significantly higher rates of DKA ($P < 0.001$) and IAA titers ($P < 0.001$) but lower c-peptide ($P < 0.001$) and HbA1c ($P < 0.001$) at diagnosis, compared to older children (n = 558). However, they were noted to have lower GAD ($P = 0.043$) and IA-2 ($P < 0.001$) antibody titers. Preschoolers also had significantly higher HbA1c at 6 ($P < 0.001$) and 12 months ($P = 0.005$). Partial remission was seen in 278 (40.4%) children at 6 month. Preschoolers had significantly lower rate of PR [n = 36, (27.7%)] compared to older children [n = 242 (43.4%), $P = 0.001$)].
Conclusions: We conclude that preschool age children with T1DM have a more rapidly progressive disease as evidenced by lower c-peptide, higher rates of DKA and IAA titers. The lower HbA1c in preschoolers suggested a shorter duration of hyperglycemia at the time of diagnosis. Preshoolers also exhibited a lower rate of PR at 6 months.

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Prevalence of potential celiac disease in type 1 diabetes and in non diabetic celiac patients

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Celiac disease (CD) is frequently associated with Type 1 Diabetes Mellitus (T1DM) with a mean prevalence of 4.5%. Screening tests largely performed in all pediatric patients [antiendomysium (EMA) and/or anti-tissue transglutaminase (TGase) antibodies] select subjects who need to confirm CD diagnosis by biopsy. Subjects with positive celiac-related antibodies and normal intestinal mucosa were defined as CD-pot.
Aim: To compare the prevalence of CD-pot among EmA/TGase-positive T1DM patients (Group A) and in non-diabetic celiac patients (Group B).
Methods: All (A + B) patients presented EmA/TGase positivity and underwent small bowel biopsy. Data of T1DM patients were collected in 28 Italian Centres of Pediatric Diabetes. Data of non diabetic CD patients were collected in 2 pediatric centres of Naples.
Results: Group A: 621 out 8671 T1DM patients (7.16%) presented EmA/TGase positivity (age 13.7 ± 6.9, range 3–27), 546 with compromised mucosa (CD, 6.3%), 75 with normal mucosa (CD-pot 0.8%). Prevalence of CD-pot on all EMA/TGase positive T1DM patients was 12%. Symptoms were present in 11 (15%): abdominal pain (6), failure to thrive (3) and diarrhoea (2); 10 symptomatic patients (13.3%) observe a gluten-free diet. At first serological positivity age was 8.67 ± 5.11. 14/75 (18.6%) had another autoimmune disorder (12 thyroiditis, one multiple sclerosis and one thrombocytopenia).
Group B: in non diabetic CD-patients (894) CD-pot were 126 (14.1%). Age 15.9 ± 6.9, range 7–29. Symptoms were present in 25 (20%): abdominal pain (15), failure to thrive (7) and diarrhea (3); 12 symptomatic patients (10%) observe a gluten-free diet. Age at first diagnostic positivity was 9.7 ± 4.1 (range 3–29). Six patients presented also thyroiditis (5%).
Prevalence of CD-pot in patients positive celiac-related antibodies is similar in T1DM and in non diabetic young population.

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Enterovirus and parechovirus infections in infancy and development of autoimmunity

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Objectives: The increase in Type 1 Diabetes (T1D) the last decades can not be explained by genetic factors, but by unknown environmental risk factors for T1D. The hygiene hypothesis states that the lack of infections in early childhood is the reason behind the increasing incidence of allergic diseases, and probably also of T1D. The association between entero- and parechovirus infections in early childhood and later development of autoimmunity has been studied in a nested case-control study to test if selected viruses are associated with development of autoimmunity and to test the hygiene hypothesis.
Methods: Children with the highest genetic risk for T1D, enrolled in the MIDIA project, were used in this study. In the MIDIA project, stool samples are collected monthly until 3 years of age and autoantibodies measured every 3 months in the first year of life and then annually. Of the children followed in the MIDIA project, 27 subjects developed confirmed autoimmunity (positivity for 2 or 3 autoantibodies) or T1D and were assigned as cases. In addition, 54 healthy children matched for geographical location and age were used as controls. The stool samples of these children (taken from 2004 to 2008) were tested for the presence of Enterovirus (EV), Human Parechovirus (HPeV) and Ljungan virus (LV) RNA with real-time PCR.
Results: There was no LV detected in the stool samples tested, and no differences in the prevalence of HPeV positive samples between the cases (15.6%) and the controls (14.2%). There was, however, a difference between the cases (14.9%) and controls (20.7%) in EV positive samples [OR (independent samples) = 0.67, $P = 0.96$].
Conclusions: HPeV and EV infections are common and usually asymptomatic in childhood. HPeV positivity did not show any association with development of autoimmunity. There was, however, a trend of more EV positive samples in the early infancy of children without any sign of autoimmunity.

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Diabetes ketoacidosis at onset, changing with change in incidence of diabetes?

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Frequency of DKA at onset, varies between countries, but remains an important risk factor for morbidity and mortality. It may be as low as 0% after intensive campaigning. In Europe, it varies between 26% and 67%. An increase in the incidence of t1dm may lead to a greater awareness for its symptoms at onset. Therefore, a retrospective study was undertaken to evaluate this in Luxembourg.
Methods: Retrospective case record evaluation of t1dm in children and adolescents (< 20 years) in Luxembourg, diagnosed between 1989 and 2007 with or without dka at onset. All children, below

20 years of age, diagnosed with t1dm at the paediatric clinic in Luxembourg between 1989 and 2007 were included.
Results: Between 1989 and 2007, an important increase in incidence has been observed with an incidence starting at 12 and increasing towards 20 new cases per 100 000 DKA in the first years is present in about 7% of the children. Thereafter it increases continuously towards 22% over the last 5 years. The last 3 years, DKA has been complicated by cerebral oedema in 2 children, one with severe neurological damage and death in the second child.
Discussion: DKA at onset of t1dm in children in Luxembourg remains low. It is upsetting that over time an increased frequency and severity is observed. Intensive campaigning will be needed to create sufficient awareness in the general population, the school and para/medical health care professionals to prevent diabetes ketoacidosis.

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Nation-wide quality work in childhood-onset diabetes – national childhood diabetes registry increases awareness among paediatricians treating childhood-onset diabetes

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Objectives: Norway has one of the highest incidences of childhood-onset diabetes in the world (>32 per 100 000). More than 95% of all childhood-onset diabetes in Norway is Type 1 diabetes (T1D).The Norwegian Childhood Diabetes Registry includes data on new onset diabetes from 1973 and annual benchmarking data since 2001. The goals of the Norwegian Childhood Diabetes Registry: 1) surveillance of incidence of diabetes in children and adolescent, 2) to improve the diagnostics and classification of the disease, 3) to improve treatment, 4) surveillance of acute and late complications, 5) maintain and further develop a network for quality work among paediatric departments to ensure an equal treatment, 6) stimulate diabetes research.
Methods: Registration of all new onset cases of diabetes, includes clinical data, family history and blood samples. Standardized annual registration of clinical data, complications screening, diabetes treatment, and smoking. HbA1c measured in one central laboratory for all patients. All paediatric departments in Norway participate in this registration.
Results: In 2008, 306 patients age <15 years were diagnosed with T1D and 2059 cases participated in the annual benchmarking registration (98% T1D, 0.4% T2D, 1.3% MODY). Mean HbA1c 8.6% (range 7.9–9.1). 50% of the patients were treated with insulin pump. 5% had been hospitalized with diabetes ketoacidosis. 6% had had severe hypoglycaemia with unconsciousness and/or convulsions. 1923 patients were screened for nephropathy; 0.4% had persistent microalbuminuria, no proteinuria. 684 patients had an eye examination; 0.2% had retinopathy, 0.1% had received laser treatment.
Conclusions: Nation-wide childhood diabetes registries gives vital information about incidence and changes in incidence, surveillance of acute and late complications and screening procedures. The registry maintains and further develops a network for quality work among paediatric departments to ensure an equal treatment in Norway.

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Prevalence of type 1 diabetes in North India: a physician and chemist based district level assessment

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Little work has been done on the prevalence of type 1 diabetes in North India. This paper reports the prevalence of type 1 diabetes in Karnal District of Haryana state, India as assessed by a hospital-based registry and by inputs from chemists and other physicians. Data of all type 1 diabetes patients attending the only endocrine OPD in the region was analysed, and screened for patients living in the district. All chemists in insulin business were contacted through wholesalers of the drug and requested about details of children purchasing insulin. Similarly all 18 paediatricians and 22 internists working at other urban centres within the district were requested for details of patients being treated by them. All names and addresses were cross checked to avoid duplication.Population data was taken from the 2001 national census. The survey revealed 79 male and 51 females with type 1 diabetes in the district. Of these 54 men and 36 women were from urban areas, while 25 men and 15 women were from a rural background. The overall prevalence of type 1 diabetes in Karnal district was 10.20/100 000 population (130/1 274 183), with a higher prevalence in urban areas: 26.6/100 000 (90/337 842) as compared to rural areas: 4.27/100 000 (40/936 341). Karnal City, with a population of 222 017, showed a high prevalence of type 1 diabetes 31.9/100 000 (total 71 patients). The prevalence in men was much higher (11.56/100 000 or 79/683 368) than in women (8.6/100 000 or 51/590 815). Prevalence was 21.2/100 000 (3/14 119) and 18.2/100 000 (2/10 931) in boys and girls, aged 0 to 6 years respectively, yielding a total of 19.9/100 000 (5/25 090). This work highlights the relatively high incidence of type 1 diabetes in North India, with a high male: female gender ratio, and high urban: rural gradient, using a simple, economical methodology. This methodology may be appropriate for assessing the prevalence of diabetes in many developing nations.

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The application of ISPAD consensus guidelines in determination of the specific etiology of DM among patients at a children's hospital

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Brief description: The clinical availability of assays for autoimmunity ''markers'' has important diagnostic and therapeutic implications. These markers are usually present in the sera of children with recent-onset type 1 Diabetes Mellitus (DM). The combination of screening for antibody markers in new onsets, as well as the availability of genetic studies to diagnose the major forms of monogenic diabetes, has enabled clinicians to determine a specific etiology in a much higher percentage of children presenting with diabetes.
Objective: Assess the clinical impact of efforts to identify the specific etiology of diabetes among patients in a children's hospital diabetes program.
Methods: In our practice of approximately 1000–1200 children and adolescents with DM, it has been the standard of care to measure autoimmunity ''markers'' (IAA, ICA, and GAD-65) in all new-onset patients. Subsequently, in clinic follow-up, we evaluate the etiology of DM in each of our patients by reviewing their initial antibody ''marker'' results. If antibody negative and not clearly

established as having insulin resistance-associated T2DM, we then apply the consensus guidelines to evaluate for monogenic diabetes.
Results: Our poster presentation includes the following: A review of the ISPAD criteria, case reports of 3 family pedigrees illustrating change in diagnosis, the overall etiologic profile of the diabetes population with categories of the identified mutations, and data on patient responses to treatment changes that were made based on determination of the specific etiology of diabetes.
Conclusions: Our review has identified 12 pediatric patients with changes in diagnosis from T1/T2DM to monogenic mutations. Correction of the original diagnosis has not only affected treatment of the probands, but also 2–3 generations of family members. Additional support and education is critical not only in pediatrics, but in adult diabetes programs in order to offer comprehensive diabetes management.

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Type 1 Diabetes (T1DM) in Polish children, 1983–2020 – incidence based on different predictive models

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Objectives: In Poland as well as world-wide incidence of childhood T1DM has been increasing. The aim of this study was to assess present and future time trends in the incidence of T1DM in Polish children and to develop different predictive models for the future.
Methods: Regional registers that covered 35% of the Polish population ascertained prospectively using the EURODIAB criteria incident cases of T1DM under the age 15 years, between 1989 and 2004. Linear and generalized additive modeling (GAM) were used to predict the annual number of new cases in the overall Polish population between 1989 and 2020.
Results: The primary study population consisted of 4268 incident T1DM cases (2230 ♂, 2038 ♀). In 1989–2004, the average age-sex-standardized incidence was 9.9/100 000/year (95% CI 8.5–11.6). The incidence has increased more than 3-fold, from 5.2 to 17.2/100 000/year, between 1989 and 2004. The incidence has increased the most among children aged 5–9 years, on average by nearly 1.0/100 000/year (95% CI 0.8–1.1). There was a significant non-linear component to the time trend ($P < 0.000001$). The number of Polish children predicted to develop T1DM between 2005 and 2020, assuming constant population size, was 20 993 and 32 375 for the linear model and GAM respectively. Datasets comparable to the primary register, preceding or following the study period, were analyzed to estimate GAM validity. The prediction errors of, respectively, 5.1% and 1.2% for the Silesia and Lodz register incidence in 1983–1988 validated the non-linear model.
Conclusions: Incidence of childhood T1DM in Poland has increased during the recent 15-years 3-fold and is predicted to increase additionally at least 3-fold between 2005 and 2020. Concerning the increasing incidence, GAM seems to be a more adequate predictive model for the near future.
Acknowledgment: The work was partially financed by KBN grant no 402279134 and EUBIROD grant no 2007115.

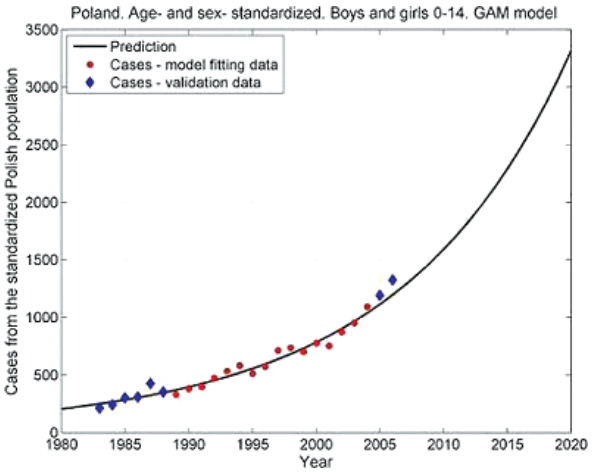

Figure 1.

Poster Session II: Diabetes Genetics, Immunology I

P/162/FRI

Study concerning the genetic background in the infantile population with type 1 diabetes mellitus

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Introduction: Almost all genes proved to be associated type 1 DM have a variable but quite increased prevalence also in the general population.
Aims: 1. To detect class II HLA antigenes of susceptibility for type 1 DM in a group of type 1 DM children. 2. To study the transmission of the genetic predisposition - by HLA alleles determination- in the healthy family members of these children.
Material and method: The studied lot included two groups of children: group A -14 cases (9 F, 5 M) and group B - 30 subjects, of which 9 children with type 1 DM (4 F, 5 M) and 21 healthy individuals representing their family members (siblings and non-diabetic parents). In the studied lot we have determined the HLA alleles. HLA typing used INNO-LIPA HLA-B DRB1 tests for the allele group between DRB1*01 and DRB1*16. For the interpretation of the results we used the ''Dynal Biotech pattern Matching Program S42'' soft.
Results: In group A, in 11 patients type 1 DM we found the DQB1*0201 alleles; of these 6 associated DQB1*03DGZ allele while in 1 case we found DQB1*03CJB allele. In group B, typing of HLA alleles in the type 1 |DM children revealed 5 cases with DQB1*0201, 2 boys with DQB1*03 XX, 1 girl with DQB1*03 DGZ and 1 boy with DQB1*0501. Of the 3 nondiabetic siblings of type 1 DM patients, 2 presented the same alleles like the one with type 1 DM (DQB1*0201 and DQB1*03 XX respectively) while the third was DQB1*0201 positive, concording with the alleles found in parents,but different from those found in the type 1 DM child. In parents allels varied from DQB1*0201 (8 of 30 cases – 26.66%) to DQB1*06XX.
Conclusions: 1. The most frequently encountered alleles in type 1 DM patients in Romania are DQB1*0201 (alone or associated with other alleles- 69.56%) and DQB1*03DGZ (34.78%) 2. The

expression of the susceptibility genes for type 1 DM is also found in the non-diabetic population studied, meaning that genetic susceptibility in not the single cause for the occurence of type 1 DM.

P/163/FRI
TSH Receptor autoantibodies in patients with type 1 diabetes mellitus

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Objectives: Autoimmune thyroid disease (AITD) is the most prevalent autoimmune disorder associated with type 1 diabetes (T1D). The purpose of the study was to determine TSH receptor autoatibodies (TSHR Ab) levels in the group of type 1 diabetic pediatric patients with or without thyroid dysfunction.

Methods: In the group of 84 children with T1D, age 2–18 year (11.3 ± 4.47), girls (58.3%), with T1D duration from 1 up to 11 year (2.89 ± 2.35) anti TSH receptor autoantibodies (TSHR Ab), thyroid peroxidase antibodies (TPO Ab) and thyroblobulin antibodies (TG Ab) levels were measured. TSHR Ab > 14 U/l, TPO Ab > 50 U/ml, TG Ab > 70 U/ml were considered positive. Radioreceptor assay for quantitative determination of TSHR Ab was performed. TPO Ab and TG Ab levels were measured by ELISA. In all children clinical, hormonal examination and thyroid ultrasound, if necessary, were performed to establish thyroid function.

Results: None of 84 children had TSHR Ab. (+) TPO Ab, (+) TG Ab or both (+) TPO Ab and TG Ab determination were present in 24 of 84 patients (28.6%). Girls (77.8%) had more frequently raised antibodies than boys. (+) TPO Ab were present in 13 children (15.5%) - in 2 of them subclinical hypothyroidism was recognised and 1 patient was treated with L-thyroxine due to hypo state. (+) TG Ab were present in 11 children (13.1%) - in 2 of 11 subclinical hypothyroidism was recognised, only 6 patients (7.2%) were positive for both TPO Ab and TG Ab - in 2 of 6 children subclinical hypothyroidism was determined. Subclinical hypothyroidism is recognised in 4 children with (-) TPO Ab and TG Ab levels. The hyperthyroidism was determined in 1 patient with (+) TPO Ab.

Conclusions: 1) TSH R Ab-based screening is not probably useful at the beginning of autoimmune thyroid disease in type 1 diabetic patients. 2) further studies should be conducted to study the benefits of TSHR Ab determination particularly among those t patients who have longer T1D duration.

P/164/FRI
Associated celiac disease in children and adolescents with type 1 diabetes mellitus (DM1)

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Background: DM1 is associated with other autoimmune diseases, among which is celiac disease (CD). The most reliable serological marker for the screening of CD is the presence of tissue transglutaminase antibodies (tTG).

Aims and methods: The aim of this study was: 1. To assess the prevalence of CD in Greek children and adolescents with DM1, 2. To evaluate its possible association with diabetes duration and gender, 3. To study the effect of CD on growth and glycaemic control. The study group included 144 DM1 children (male/female: 77/67), aged (mean ± SD) 12.3 ± 4.6years, with a diabetes duration of 4.6 ± 3.9 years. During each hospital visit growth and puberty was assessed. For the diagnosis of CD, tTG IgA autoantibodies were measured.

Results: 9/144 DM1children (6.25%) were found to have tTG IgA autoantibodies. These were predominantly girls [boys (5.6%) vs. girls (11.8%), $P = 0.049$], with shorter height (htsds: -1.01 vs. +0.21, $P = 0.006$), shorter diabetes duration (2.3 vs. 4.6 years, $P = 0.042$) and similar HbA1c levels with the rest of the DM1children (HbA1c: 7.75 vs. 8.15%, P = NS). Multiple logistic regression analysis showed that the presence of tTG IgA autoantibodies was only associated with female gender (OR: 1.50, 95% CI: 0.89, 22.31). Only 5/9 (55.5%) tTG IgA positive children developed mild gastrointestinal symptoms, anaemia and growth retardation. All children with high titres of tTG IgA underwent celiac biopsy (4/9) and all had histological findings typical of CD. In 1 child CD antibody positivity was diagnosed before DM1, in 4 children it was diagnosed simultaneously, and in 4 children it followed DM1 diagnosis. No associations were found between CD and parietal cells (APCA) or thyroid (anti-TG, anti-TPO) autoantibodies.

Conclusion: CD seems to be more common in female children with DM1 and may present early in the course of the disease. It usually presents with mild symptoms or is asymptomatic. Thus the importance of its early diagnosis by regular autoantibody screening, is underlined.

P/165/FRI
Genetic characteristics in a small Romanian study group with insulin-dependent diabetes from Constanta county

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Objective: The association of type 1 diabetes mellitus with certain HLA alleles is well documented. The major genetic determinants are alleles at HLA-DRB1 and DQB1 loci, harboring both susceptible and protective haplotypes. The aim of this study is to characterize our group of patients in respect with the HLA-DRB1 and DQB1 alleles.

Methods: HLA class II DRB1 and DQB1 alleles were determined in 49 type 1 diabetes pediatric patients using specific oligonucleotide typing after gene amplification of the second exon. The class II genes profiles were analyzed according to the age of onset. For this analysis the genotypes were referred to as high-risk, carrying both high-risk haplotypes (DR3/DR4), carrying one high risk haplotype, either DR3 and DR4, and carrying no high risk haplotype.

Results: The high-risk genotype DR3/DR4 was found in 28.5% of all patients, with similar higher frequency in the groups with onset at 5–9 years and 10–14 years. Only one patient out of ten with the onset in the interval 0–4 years had this high-risk genotype. The DR4/Y genotype had the highest frequency in our group – 38.8% of all patients, being most well represented in the 10–14 years at onset group. The DR3/X genotype occurred in 30.6% of patients, with the highest frequency in the 0–4 years at onset group, in five out of ten patients. Only one genotype nonDR3/nonDR4 was found in the group 0–4 years at onset.

Conclusions: Our group showed an unusual pattern of class II HLA genes. Almost all patients - 48/49 - carried at least one high risk haplotype. The DR4 haplotypes were found with a highest frequency. This pattern is different from other Caucasian

populations but was previously reported for other Romanian populations probably accounting for the small number of cases with onset before 4 years. The study will be continued by increasing the group size and typing of healthy related controls.

P/166/FRI

The association CTLA-4 single nucleotide polymorphisms (-318C/T and 49A/G) and HLA-haplotypes in type 1 diabetes mellitus in Moscow population

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Introduction: Our previous research predisposed haplotypes to type 1 diabetes mellitus (T1DM) were revealed in 8% of healthy subjects in Moscow. Otherwise, 21% of diabetic patients did not have predisposed haplotypes. Searching for other candidate genes and its polymorphisms could shed light on the multiple inheritance of T1DM.

Objectives: The aim of the present study is to investigate the association of the genetic variants in the CTLA-4 and HLA-haplotypes in T1DM.

Materials and methods: The analysis of HLA-haplotypes and single nucleotide polymorphisms (SNP) of the CTLA-4 gene was performed at 113 diabetic patients and 100 healthy subjects in MP.

Results: The RR of development T1DM is 4.93 at presence of haplotype DRB1*04-DQA1*0301-DQB1*0302. The combination of ag CTLA-4 A49G with DRB1*04-DQA1*0301-DQB1*0302 decreases RR to 0.21 ($P < 0.05$).

The combination of protective HLA-haplotypes DRB1*07-DQA1*0201-DQB1*0201 with protective variant c/t CTLA-4 318C/T increases RR from 0.44 to 0.17.

The presence of neutral genotype nonDRB1*04-DQA1*0301-DQB1*0302/nonDRB1*17 (03)-DQA1*0501-DQB1*0201 and aa CTLA-4 A49G makes the genotype protective (RR = 0.24, $P < 0.05$). Interestingly, the presence of g + CTLA-4 A49G in combination with nonDRB1*04-DQA1*0301-DQB1*0302/nonDRB1*17 (03)-DQA1*0501-DQB1*0201 are associated with increasing RR to 4.1 ($P < 0.05$). The presence of c/t CTLA-4 318C/T with nonDRB1*04-DQA1*0301-DQB1*0302/nonDRB1*17 (03)-DQA1*0501-DQB1*0201 are associated with RR = 0.18 ($P < 0.05$).

Conclusion: This data shows mutual influence of SNPs CTLA-4 gene and HLA-haplotypes on RR in development T1DM in MP.

P/167/FRI

Successful transfer from insulin to oral sulphonylurea in a 3 year Saudi girl with a mutation in the KCNJ11 gene

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Neonatal diabetes mellitus is considered to be a rare disease that is diagnosed in the first six months of life and can be either transient or permanent. Recent advances in molecular genetics have shown that activating mutations in KCNJ11 (the gene that encodes for the Kir6.2 subunit of the K_{ATP} potassium channel of the pancreatic β-cell) is a common cause of permanent neonatal diabetes mellitus. Patients with mutations in this gene may respond to oral sulphonyureas. In this case report we describe a three-year-old girl with permanent neonatal diabetes mellitus with a mutation in KCNJ11 gene (R201H) who was successfully transferred from subcutaneous insulin to oral glibenclamide with marked improvement in glycaemic control. This is the first successful switch from insulin to oral sulphonylurea in a patient with the R201H mutation in the Arabian Gulf.

P/168/FRI

Functional impairment of the pancreatic beta cells and other endocrine tissues by iron overload due to repetitive erythrocyte transfusions

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Objective: To present a rare form of diabetes resulting from hemosiderosis and to illustrate the susceptibility of various endocrine tissues to iron overload.

Methods: In a male patient suffering from Blackfan-Diamond anaemia requiring monthly erythrocyte transfusions since the age of seven years, endocrine function was assessed by history, basal and functional studies.

Results: Despite treatment with desferoxamine since the age of 13 years, hypogonadotrophic hypogonadism was identified at age 15 when puberty did not occur spontaneously and testosterone proved unsuccessful in stimulating the hyothalamo-pituitary axis. Lack of the pubertal growth spurt despite testosterone replacement therapy revealed partial growth hormone (GH) deficiency confirmed by impaired overnight secretion of GH. Severe GH deficiency was diagnosed at age 38 by GHRH-arginine testing. Primary hypothyreoidism was treated with L-thyroxine from the age of 19 years. At age 22 years, HbA1c was first documented to be elevated to 7.2% despite ''diluting'' monthly transfusions. Despite impaired fasting glucose and impaired glucose tolerance during oGTT since then, HbA1c is stable with dietary restrictions only. From the age of 24 years, repetitive episodes of hypocalcemia and hyperphosphatemia were documented despite oral substitution of calcium and vitamin D and normal renal function. PTH was undetectable, indicating hypoparathyroidism. Hemosiderosis of the anterior pituitary and the thyroid gland were visualized by MR imaging.

Conclusion: Iron overload beginning in childhood induces sequential impairment of puberty, growth, thyroid, parathyroid and beta cell function. Diabetes progression into insulin dependence seems to occur rather slowly in hemosiderosis.

Poster Session I: Diabetes Genetics, Immunology II

P/169/WED

HLA-DQB1 alleles as immunogenetic markers of inverse association between diabetes mellitus type I and atopic asthma: a hypothesis

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Objectives: Atopic diseases seem to occur less often than expected in children with T1DM and vice versa. T1DM is a Th1 while atopic

asthma is a Th2-mediated disease. HLA molecules play a key role in the pathogenesis of T1DM and influence the type of the immune response (Th1/Th2).

Methods: In order to study the incidence of predisposing/protective for T1DM HLA-DQ(B1-A1) alleles in individuals with atopic asthma, six HLA-DQB1 allele typing was performed in 96 asthmatic individuals, 129 children with T1DM and 1784 controls with further typing of three DQA1 alleles in HLA-DQB1*0201,x carriers.

Results: A lower incidence of the predisposing to T1DM alleles DQB1*0201, DQB1*0302 ($P < 0.001$) and a higher incidence of the protective ones DQB1*0301, DQB1*0602 and DQB1*0603 ($P < 0.001$ and $P < 0.025$ respectively) was found in asthmatic children. The predisposing allele for atopic asthma was HLA-DQB1*0301. The protective for T1DM genotype DQB1*0201,*0301 was found in a higher incidence among the asthmatic individuals compared with either T1DM patients or controls. Asthmatic patients with the DQB1*0201,x genotype carry the protective for T1DM DQA1*0201 allele in a higher incidence compared with individuals with T1DM.

Conclusions: The difference in the genetic background may contribute to the lower incidence of T1DM in children with atopic asthma and vice versa. Children with asthma carry the high risk alleles for T1DM in a lower incidence and the protective ones in a higher incidence, compared with T1DM patients. Furthermore, DQB1*0301 is an allele predisposing for atopic asthma.

P/170/WED

Assessment of interleukin 18 in children with type 1 diabetes and their relatives: its relation to autoantibodies

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Background: Interleukin 18 (IL18) proinflammatory cytokine, has been implicated in a variety of pathological conditions such as rheumatoid arthritis, T1DM & inflammatory liver disease.

Aim: To evaluate level of IL18 and antipancreatic autoantibodies in a in children with T1DM & their brothers/sisters (relatives) for early detection of the risk of development of T1DM.

Subjects and methods: Twenty six children with type1 diabetes (12 male &14 female) their mean age was (12 ± 0.77) years and mean duration of disease was (3.8 ± 3.4 years) were included. Thirty one of their healthy relatives who are still normo-glycaemic without clinical or laboratory criteria of diabetes were included. Forty six age & sex matched healthy children were served as a control group. Fasting serum sample for assessment of fasting blood glucose, anti-glutamic acid decarboxylase antibodies (Anti-GAD65 Ab), tyrosine phosphatase antibodies (anti-IA2 Ab) and anti insulin antibodies (IAA Ab) and Interleukin 18 were taken. Relatives with 2 or more positive autoantibodies were considered high risk for disease.

Results: Frequency of anti-GAD antibody was significantly higher in patients with T1DM and their relatives than control, while anti IA2 and IAA antibodies were significantly higher in patients with type 1 diabetes than their relatives and control. One positive antibody was found in (33.3%), two antibodies in (56.7%) and three antibodies was found in (10%) of the unaffected relatives of diabetic children.IL18 was higher in relatives of diabetic patients than diabetic chilren and controls but it was not significant. No significant difference in IL 18 between high and low risk relatives. However only one of the high risk relatives discovered accidently to have diabetes showed very high IL18 level.

Conclution: Serum IL18 seemed to be increased selectivly during early clinical stage of type1diabetes. However, IL18 & at least two autoantibodies should be studied on larger scale.

P/171/WED

Circulating nucleic acids as damage - associated molecular patterns (Damps) in juvenile diabetes

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The immune response may be triggered the pathogen-associated or by damage-associated molecular patterns, derived from damaged cells (PAMPs and DAMPs). The DAMPs, acting as 'alarmins' and 'endokines' initiate strong inflammatory response via activation of antigen presenting cells, production of pro-inflammatory cytokines (IL-1, TNF-α, IL-6, IL-8), cell adhesion molecules (ICAM-1, VCAM-1) and by activation of vascular endothelium. DAMPs mediate immune responses through the TLRs, RAGE and NOD1-like receptors. In our previous reports increased level of circulating ribonucleic acids (CRNAs) was documented to occur in juvenile diabetes. Since the higher prevalence of various infectious diseases is documented to develop in type 1 diabetic patients, the aim of the present study is to evaluate possible modulation of immuno-inflammatory cascade and antiviral response by circulating nucleic acids as possible DAMP molecules in juvenile diabetes. Examined groups were juvenile type 1 diabetic patients (n = 46) and control children (n = 27). The immunomodulatory effect of circulating nucleic acids was monitored on peripheral blood mononuclear cells (PBMCs), isolated from 100 ml blood of one donor volunteer. The PBMCs were treated with RNA samples purified from plasma of juvenile diabetic patients and control healthy children. Corresponding intact PBMC were incubated with physiological saline. The Bcl2, Bax, NF-kB, MDA-5 and IRF-3 expression was estimated after 4 hours of incubation. The Bcl2/Bax significantly increased in PBMCs treated with the CRNAs of juvenile type 1 diabetes (1.30 vs. 0.64 in control children $P < 0.05$), followed by the decreased NF-κB of 12.5%, and antiviral proteins, MDA-5 (by -23.8%) and IRF-3 (by-14.9%). MDA-5/IRF-3 axis was documented to be a subject of down-regulation during the evasion of viruses, important for development of diabetes. Supression of signalling regulators of antiviral response may contribute to increased susceptibility toward different pathogens.

P/172/WED

Type 1 diabetes incidence and prevalence of predisposing and protective HLA-haplotypes in Russian and Yakuts populations of Russian federation

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Aim: To investigate prevalence of predisposing and protective haplotypes in populations with different levels of type 1 diabetes in different populations.

Material and methods: HLA-genotyping was performed in 984 subjects without type 1 diabetes and free from aggravating heredity, as concerns this disease, in Russian (Moscow, Vologda) in Yakutsk populations.

Results: According the Russian Federation (RF) Register data type 1 diabetes incidence varies significantly among different RF ethnic groups. Incidence rate in Moscow population can be estimated as 12.3 cases; in Vologda population - 21.4 cases; in Yakutsk one - 1.6 cases per 100 000 persons. No significant

differences have been observed in prevalence of main predisposing haplotypes (DRB1*04-DQA1*0301-DQB1*0302; DRB1*17 (03)-DQA1*0501-DQB1*0201) in three populations ($P > 0.05$). Protective haplotype DRB1*11-DQA1*0501-DQB1*0301was found significantly more rarely in Vologda population (9.1%) than in Moscow one (14.5%, $P < 0.02$). Lower prevalence of two protective haplotypes: DRB1*11-DQA1*0501-DQB1*0301 and DRB1*15-DQA1*0102-DQB1*0602/8 has been observed in Yakutsk population comparing with Moscow one (7.8% vs. 14.5%, $P < 0.02$ and 2.0% vs. 9.7%, $P < 0.001$, respectively). However protective haplotype specific for this group DRB1*09-DQA1*0301-DQB1*0303 was isolated and was found in 11.8% cases in Yakutsk population, comparing with 0.6% in Moscow one ($P < 0.001$).

Conclusion: Differences in type 1 diabetes incidence rate of two Russian populations (Moscow and Vologda) are likely determined by unknown at present environmental factors. The low level of type 1 diabetes morbidity in Yakutsk population might be determined by large differences in the way of life, environment factors and, probably, protective haplotype presence.

P/173/WED

Gamma–Delta T lymphocytes' ($\gamma\delta$T) prevalence in peripheral blood in children with new-onset diabetes type 1 (DM1)

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Aims: To investigate $\gamma\delta$T cells mean % in peripheral blood in patients with new-onset DM1, regarding duration of hyperglycemia symptoms before presentation and severity of DKA at onset.

Material and methods: A total of 18 patients: 10 boys and 8 girls, 3–17 years, x = 11.7 years. Diabetes' symptoms duration 4–120 days, x = 40 days. Exclusion criteria included inflammation, neoplasm, and other autoimmune disease. Long symptomatous period = lasting > 21 days. DKA: mild if venous pH < 7.3, HCO_3 < 18 mmol/l; moderate: pH 7.1–7.24, HCO_3 10–15 mmol/l; severe: pH < 7.1, HCO_3 < 10 mmol/l.

Results: There were no differences in $\gamma\delta$T and activated T$\gamma\delta$CD69$^+$ mean % in patients with long/short lasting diabetes symptoms (n = 9/n = 9): 0.45–23.13, x = 8.813, SD = 4.612 and 0–0.43, x = 0.098, SD = 0.104, respectively. Activated T$\gamma\delta$CD25$^+$ and activated T$\gamma\delta$CD56$^+$ did not differ significantly in both groups, but trends were marked: in pts with short symptoms' duration activated T$\gamma\delta$CD25$^+$ % was higher (0–0.1, x = 0.029, SD = 0.033, vs. 0–0.02, x = 0.005, SD = 0.007), whereas activated T$\gamma\delta$CD56$^+$ was higher in patients with long symptomatous period (0–0.72, x = 0.112, SD = 0.227 vs. 0–0.72, x = 0.256, SD = 0.264). $\gamma\delta$T mean % in patients with no/mild DKA (n = 13) was higher ($P = 0.04$) than in moderate/severe DKA patients (n = 13): 0.45–23.13, x = 9.21, SD = 5.298 vs. 3.93–8.63, x = 6.10, SD = 1.960, respectively. Activated T$\gamma\delta$CD56$^+$ and activated T$\gamma\delta$CD69$^+$ mean % did not differ significantly, but trends were marked: in pts with no/mild DKA were higher (0–0.72, x = 0.21, SD = 0.277vs. 0–0.25, x = 0.07, SD = 0.104; 0–0.43, x = 0.09, SD = 0.126 vs. 0.02–0.13, x = 0.06, SD = 0.040, respectively). Activated T$\gamma\delta$CD25$^+$ did not differ (0–4.53, x = 0.233, SD = 0.984).

Conclusions: Lower activated $\gamma\delta$TCD25$^+$ number in pts with long symptomatous period is probably due to cells migration from peripheral blood to other tissues. Higher number of T$\gamma\delta$ cells, activated T$\gamma\delta$CD56$^+$ and activated T$\gamma\delta$CD69$^+$ in pts with moderate/severe DKA might be due to their involvement in immune reaction within pancreas.

P/174/WED

Patients with type 1 diabetes mellitus from the horn of Africa: assessment of autoimmunity and HLA-haplotypes in those living in Canada

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Background: There are few reports of type 1 diabetes (T1DM) in children living in Ethiopia, Eritrea and Somalia (EES). However, an increasing number of children of EES background are seen withT1DM at our centre.

Objective: To characterize metabolic control, clinical features, HLA haplotypes, and prevalence of islet antibodies (Ab) in children with T1DM from EES background.

Methods: Patients aged ≤18 with T1DM from EES background, were eligible for inclusion. There were no exclusion criteria. Data collected included patient demographics, anthropometrics, presenting symptoms, HbA1C, insulin regime, family history, presence of other autoimmune disease or complications. Investigations performed included: GAD65, ICA512 and ZnT8 Ab; T1DM related HLA haplotypes.

Results: A total of 43 patients (23 female) were included: 27 Somali, 9 Eritrean, 6 Ethiopian, & 1 of Ethiopian-Somali ethnic background. 39/43 were born in Canada. Age was 11.8 ± 2.8 years. Duration of T1DM was 5.1 ± 3.3 years. HbA1C was 9.2 ± 1.7% compared with 8.6 ± 2.0% for our general clinic population ($P = 0.023$). 15/41 (36.5%) presented with diabetic ketoacidosis (DKA), compared with 18% in the province of Ontario. No patient had retinopathy or nephropathy. 4/43 had celiac disease. All patients were euthyroid. Ab results and haplotypes are available for 40 patients. 15/40 had ≥1 diabetes related Ab. 29/40 (72.5%) had HLA-DR3 haplotype, including 8/40 with DR3/DR4.

Conclusions: No differences in clinical features are observed between the study population and our general clinic population. However, metabolic control in this population is significantly worse. DKA at presentation appears to be more common in this population. Interestingly, no patient had thyroid abnormalities. There was a relatively large proportion of HLA-DR3. In general, HLA haplotypes are similar to the general T1DM population. Despite coming from a region of low diabetes prevalence, Africa, typical HLA genetic susceptibility was found.

P/175/WED

HLA-DQB1 and DQA1 gene polymorphisms as genetic factors of goint susceptibility to diabetes mellitus type 1 and autoimmune thyroid disease

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Objectives: Type 1 diabetes mellitus (T1DM) is associated with other autoimmune diseases, particularly with autoimmune thyroid disease (AITD). The similar pathogenesis of T1DM and AITD as well as their tendency to occur frequently within the same family and in the same individual, suggest the involvement of common genetic factors in their etiology. The aim of our study was to assess the contribution of HLA-DQB1 and DQA1 gene polymorphisms to AITD susceptibility among children with T1DM.

Methods: To this purpose, molecular typing of six HLA-DQB1 alleles (DQB1*0201,*0301,*0302,*0602,*0603,*0604) was carried out, using the group-specific polymerase chain reaction

amplification technique, to 18 patients with T1DM and AITD, aged 11.07 ± 3.42 years, as well as to 100 patients with T1DM, age and sex matched. Further typing of three DQA1 alleles (DQA1*0201,*0301, *0201) was performed in HLA-DQB1 *0201, x carriers. In our study group, T1DM was diagnosed at an age of 7.85 ± 1.98 years and AITD at an age of 8.92 ± 2.21 years. AITD was diagnosed through positive antithyroid antibody testing and ultrasound findings suggestive of the disease (heterogenity and hypertrophy of the gland). The TSH levels at diagnosis were 5.11 ± 2.25 μIU/ml and the exogenous thyroxine requirements at last examination were 1.6 μg/kg/day.

Results: A higher incidence of the HLA-DQB1*0302, 0301 genotype ($P = 0.002$, OR: 5.22) was found in patients with T1DM and AITD compared to patients with T1DM without AITD. The HLA-DQB1*0302 allele increases the risk of AITD in patients with T1DM ($P = 0.028$, OR: 4.84). Patients with T1DM and AITD with the DQB1*0201, x genotype carry the DQA1*0501 allele in a higher incidence compared to patients without AITD ($P = 0.003$, OR: 2.87).

Conclusions: Our results support a share genetic susceptibility to T1DM and AITD. The HLA-DQB1 and DQA1 gene polymorphisms seem to modify the risk for AITD in patients with T1DM.

Poster Session II: Diabetes Project in Developing Country

P/176/FRI

Adolescent diabetes management: role of NGO's in resource poor settings

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Issues: Adolescent diabetes social stigma in India. Diabetics needs proper guidance/information/treatment outlets. This is burning issue in developing-nations like India. Hence we need to unite & form comprehensive diabetes care & counselling policy plan at ISPAD-2009-conference. Treatment options must be suitable for developing-nations considering cost of Rx. Incorporating NGO's in such efforts very effective.

Methodology: Our 15-year-old NGO started Diabetes education in rural India from 2005 as education & surveillance project to analyze social & anthropological issues facing those affected by adolescent diabetes. Total 62 adolescents enrolled by Feedback questionnaires. Got their feedback on special needs, perceptions, social attitude on diagnosis of diabetes. Factors like community-inhibition, social-ostracism, economic-difficulties, marital discord, non-availability of treatment-guidance centres, lack of trained-staff analysed. Draft policy recommended to Govt-agencies.

Lessons learned: Adolescent diabetes management must include nursing & psycho-social needs. NGO's in diabetes education is cost effective with better impact on young diabetics. Community mass intervention projects proven useful in rural communities of resource poor-nations. ISPAD-2009-conference-participants must collaborate with NGO-activists to address this issue. Uniform public health policy needed to implement & expand newer strategies to include broader range of diabetes care-issues.

Recommendations: Promoting dialogue between Government and NGO's accelerates diabetes education/awareness programs in economically poor populations. This would reduce difficulties faced by young diabetics from Asian countries. It is essential that WHO, ISPAD form common guideline manual on this issue affecting developing-countries. We graphically present our NGO's project on diabetes education plan in four phases to 35th ISPAD-2009-conference participants.

P/177/FRI

Modification of cardiovascular risk factors in children and adolescents with diabetes and with overweight and obesity in Belarus

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Objectives: The atherosclerotic process starts in childhood and its progress is mediated by the presence of identified cardiovascular (CV) risk factors. Aim of this study is to develop the interventional strategies for modification of CV risk factors in high risk groups of children and adolescents with type 1 (T1D) and type 2 diabetes (T2D) and with overweight and obesity in Belarus by studying the individual risk factors, lipids profiles and subclinical vascular signs of atherosclerosis.

Methods: The project is planned in several stages. First we study prevalence of overweight and obesity in school children and adolescents aged 10–18 years from Minsk and analyze nutritional patterns, physical activities and family history in those children and in young patients with T1D and T2D. Then we investigate prevalence of metabolic syndrome in children with overweight and obesity. We also measure carotid intima-media thickness (IMT) in children and adolescent with overweight and obesity and with diabetes compared with control group. Based on analyses of obtained CV risk factors we develop interventional programs for managing high-risk groups of children and adolescents and estimate their efficacy in a year period of intensive follow-up of those groups.

Results: We obtained the preliminary data from screening of 341 school children age 10–18 years, M/F 151/190. Mean age and mean BMI were not different between males and females, but estimated percent of total fat was higher in females ($P < 0.01$). The prevalence of overweight (BMI ≥ 90th percentile) was 10.9% in total group (9.3% in males and 12.1% in females). The prevalence of obesity (BMI ≥ 97th percentile) was 12.4% in total group (higher in males 16.1% vs. 9.5% in females). Obesity defined as estimated percent of total fat >25% in males and >30% in females was found in 16% of males and in 19% of females.

Conclusion: The first results of the study demonstrate high prevalence of overweight and obesity in school children in Belarus.

P/178/FRI

Type 1 diabetes in "Have" children in India – experience and future of the insulin pump therapy program in the state of Karnataka, India: successes, failures and social engineering

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India is a "continent" of striking extremes and contrasts: ancient to ultra modern, very rich to abjectly poor, highly intelligent to totally illiterate, and thus socially justified health care projects must reach out to all sections of society. Our Insulin Pump Project (IPP) was started in 2002; 1st Certified Insulin Pump Project in India; 8 Certified Pump Trainers (CPTs); 3 of them having T1DM and were the initial pump users (1 doctor, 1 diabetes educator, *1 volunteer*); despite 20 eminent endocrinologists and hundreds of diabetologists in our state, 90% of the total pump prescriptions in our state (Total population is 53 m) come from our own practice of 2 endocrinologists.

Program: Patients initiated = 36 (T1DM 30, T2DM 5, 2 DM 1); Offered Pump in Clinic = 30; Pump sought by patients = 6; Drop outs = 5. Reasons for going on pump: Recurrent severe hypoglycemia = 8; Wide fluctuations in BG levels = 20; Suboptimal DM control = 17; Micro/Macro vascular complications = 4; Compromised lifestyle = 18; Infants and neonates = 3; Eating disorders = 0; Pronounced dawn phenomenon = 6; Needle phobia = 1; Pregnancy-preconception = 1; Ketosis prone = 1;Competitive athletes = 0. Age at DM diagnosis = 3 to 28 years; duration of diabetes = 0 to 32 years; age at pump initiation = 3 to 45 years; number of years on pump = 1 to 7; number of basal rates/day = 4 avg; number of boluses/day = 4 avg. Complications - problems on pump: Severe hypoglycemia = 0; Metabolic deterioration DKA = 0; Site infection/recurrent = 4; Site irritation = 6; Site failure/Cannula occlusion = 6; Body image problem = 2; Insulin omission = 2; Diabetes burnout = 1.

Conclusions: Insulin pump therapy is being increasingly accepted in India; Indications, difficulties and limitations are similar to that experienced in more affluent societies; increased awareness and education of physicians and patients necessary for wider usage and benefits; Technology improvements and cost reduction (refurbished pumps, lower cost disposables) will facilitate. MAN, MACHINE AND MONEY: ALL IMPORTANT.

P/179/FRI

Genetic risk and autoantibodies profile in children from countries with low-incidence and high-incidence for type 1 diabetes

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Background: The incidence of type 1 diabetes (T1D) varies considerably among countries. Peru has an incidence rate of 0.4 per 100 000 per year and Finland has the highest one in the world (>50 per 100 000 per year). In the other hand, a steady increase in the incidence of type 1 diabetes has been reported worldwide, and this increase is particularly large in the youngest age-group (0–4 years). The genetic risk for T1D conferred by HLA haplotypes and the immunological profile are not well established in children from countries with a low incidence of T1D.

Aims: To compare the genetic risk for T1D and the immunological profile between Peruvian newborns (low-incidence country) and Finnish newborns (high-incidence country).

Methods: We will recruit participants from delivery units. All newborn babies from the general population will invited to participate. In Peru, the study will be conducted at the Cayetano Heredia Hospital (Lima) and, in Finland, at the University Hospital of Turku. We will collect cord blood spots for HLA-DQB1 typing. The genotype DQB1*02/*0302 will be defined as a high risk for T1D. Children at genetic risk for T1D will be invited for follow-up. Visits will take place every 3–6 months until the age of 2 years, and every 6–12 months thereafter. In this visits, we will detected autoantibodies against insulin and glutamic acid decarboxylase by specific radiobinding assays. Also, we will measure insulin and plasma glucose. An informed consent will be obtained from both parents and the protocol will be approved by the Ethics Committee of the Cayetano Heredia University and the University of Turku. Statistical analysis will be performed with STATA software and a *P*-value <0.5 will be considered statistical significant.

P/180/FRI

Did diabetes mellitus worsen already existing severe marasmus or did marasmus cause diabetes in an eleven-month-old severely malnourished infant in Kenya?

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Marasmus is a serious worldwide problem that involves more than 50 million children younger than 5 years. It is more frequent in children at this age because this period is characterized by increased energy needs and increased susceptibility to viral and bacterial infections. Weaning, which occurs during this period, is often complicated by factors such as geography, economy, hygiene, public health, culture and dietetics. Protein mass in organs can decrease up to 30% in the most serious forms. The brain, skeleton, and kidney are preserved, whereas the liver, heart, pancreas, and digestive tract are first affected. Most children with type 1 diabetes mellitus present with about 10% weight loss. However, they regain their weight few weeks after insulin therapy is initiated. We present a case of an 11-month infant diagnosed to have severe malnutrition, dehydration and pneumonia until she went into coma. In the process of looking for hypoglycaemia common in these patients a diagnosis of diabetes ketoacidosis was made. The management of marasmus and diabetes ketoacidosis are both standard but the latter had to take priority without compromising nutritional therapy. As one gives education to the parents of such an infant the challenge one has is to separate the two diagnoses and explain which condition occurred before the other.

P/181/FRI

Take action programme in Bangladesh

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Bangladesh is one of the developing countries in the world and has the lowest health care spending per capita making even basic medical care unaffordable. It is estimated that over three million people have diabetes in Bangladesh and few of them receive optimum medical care. Bangladesh Diabetic Samity (BADAS) provides excellent diabetic care through a central institute-BIRDEM, which is a tertiary centre located in Dhaka. Over 2000 children and adolescents are registered here and most of them getting free medical care. Take Action project in Bangladesh is an initiative of WDF with joint collaboration of BADAS funded by Novo Nordisk employees. The programme commenced with focus on providing free insulin, syringes & urine strips to poor diabetic children. Initially sixty children were enrolled but now it has extended with hundred diabetic children with scope of monitoring glycaemic control by free HbA1c twice yearly. Inclusion criteria are: children <15 years, from poor socio-economic condition and residents of Dhaka. Several recreational activities were organized. A painting session was held where children expressed their feelings about the impact diabetes has on their lives. A day trip to an amusement park was also organized with children and their families. Last year a rally was organized with them to commemorate the World Diabetes day.A camp was organized with the children and families with diabetes care team of BIRDEM. The purpose of the camp was to provide an educational as well as recreational experience away from hospital and home in a relaxed non-hospital atmosphere. The diagnosis of diabetes for a child is devastating for a family both mentally and financially where most of the people cannot afford their basic medical care. Take Action is

helping these families & also contributing to BADAS in its mission to provide free care to the poor diabetic children.
Acknowledgement: Novo Nordisk employees & WDF.

P/182/FRI
Diabetes mellitus type 1 in siblings
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Serbia developed Diabetes registry in 2004. Since data at presentation and follow up visits are entered, we wanted to see if this database is suitable for research purposes. It is estimated that $<10\%$ of siblings develop Diabetes Mellitus type 1 (DMT1).
Objectives: We wanted to find the percentage of families with more than one child with DMT1 in our clinic population. The second objective was to compare the presentation and clinical course in the first year between the two siblings.
Methods: We analyzed the following data: duration of symptoms, presence of ketones, HbA1c at the beginning, and at 3-month interval in the first year and number of days of diabetes teaching.
Results: We were able to identify 9 families who had two children with DMT1 among 412 patients included in the database.
We conclude that Diabetes registry could be useful for obtaining the data and that the other possibilities for research should be explored. We have 3% of families with more than one children with DMT1 in our clinic. Although they presented earlier and with better HbA1c compared to their sibling, we need to improve our diabetes teaching.

Table [Presentation data]

	First sibling	Second sibling
Ketoacidosis/Ketones	7/9	2/4
Duration of symptoms (days)	28	8
HbA1c at presentation (%)	12.9	9.8
HbA1c at 12 months (%)	8.1	7.4

P/183/FRI
A project on diabetes in developing countries
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DiabetClub-Murat Demir, Diabet, Kocaeli, Turkey

Aim: To prevent from bad effects of diabetes by facilitating the directing style with diabetes.
Target: To teach diabetes exercise programs with the target of melting the fat in abdominal area. These education programs of living with diabetes in a healthy way include diabetics, families and people who provide services.
Method: We tested by surveys to check how well the diabetics and the centres who provide services know about diabetes. We got permissions from their connected centres which we saw some lack of knowledge and we educated them by teaching them about diabetes and we used the press to make a large participation. By using SMS, we reached the diabetics, who were registered before by pharmacies studies and area studies, to let them listen loudly, we recorded the exercise program in CD and MP3 players. We made blood tests to check if they do exercises regularly. For patients whose results were high, we reorganized exercise programs to educate them to use medicines in regular amounts and times and we made them exercise together with other patients who use the same pharmacies. We educated them to use the devices correctly and to test regularly. We taught them to live in health with diabetes in order to prevent them from being into depression after they test by themselves. We also organized education seminars for the relatives of diabetics to make them learn about the psychological structures of the diabetics to help them live with diabetes alone. Not only diabetes and their relatives joined these seminars but also people who provides social services, medical product staffs, diabetes education nurses and doctors joined.

Poster Session I: Monogenic Diabetes Forms and Their Treatment

P/184/WED
Association between type 1 diabetes mellitus (T1DM) and maturity onset diabetes of the young (MODY): report of two cases
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The onset of T1DM in subjects with MODY has been rarely described. We report two patients affected by MODY who progressively developed marked hyperglycemia.
Case 1: A 4-year-old girl was refered for glycosuria. Initial fasting glucose was 99 mg/dl and HbA1c 6.6%. ICA and GADA were negative, HLA DR3-DR6. Father, uncle and grandmother had mild hyperglycemia, never requiring treatment. She was screened for MODY 2 and a mutation in glucokinase gene was found [IVS7 + 2T > A]. Her father and sister shared the same mutation. Few months later, during an infectious disease, blood glucose raised to 300 mg/dl. She was put on a combined therapy with insulin and glybenclamide. A high titer of GADA was detected. Her insulin requirement gradually increased from 0.4 to 0.8 U/Kg/day. The patient is the only affected member of the family requiring a pharmacological treatment to maintain good metabolic control (HbA1c 6.9%). C-peptide is 0.6 ng/ml after onset of the GADA positivity.
Case 2: A 15-year-old boy treated with GH for GH deficiency for 6 months. During routinary tests blood glucose was106 mg/dl. Family history was positive for autoimmune diseases (connectivities, thyroiditis) and T2DM. HbA1c was 7.2%, C-peptide 1.9 ng/ml. ICA and GADA were negative, HLA DR4. Autoimmune thyroiditis was then diagnosed. The patient was investigated for MODY 2 and MODY 3 and a mutation of HNF1 alfa gene was found [p.G31D (c.92G > A)]. The same mutation was found in the mother. After 1 year due to a worsened metabolic control (HbA1c 12.7%), autoimmunity was investigated and a mild positivity for GADA and ICA was found. He was put on insulin therapy (1 U/Kg/day). The boy showed an increasing positivity for autoantibodies and an undetectable c-peptide. Present metabolic control is poor (HbA1c 8.2%).
Conclusions: The diagnosis of MODY 2 or 3 does not exclude the risk of developing T1DM. Autoimmunity should be investigated in these patients if metabolic control unexpectedly worsens.

P/185/WED
Exocrine pancreatic insufficiency is rare in children with type 1 diabetes
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Objective: Recent studies suggest a dysfunction of the exocrine pancreas in 10–45% of patients with type 1 diabetes, which is often not recognized in clinical practice, but may be easily diagnosed by a the measurement of elastase concentration in the feces (FE). While

most of the studies were done in adults, we determined the prevalence of pancreatic exocrine dysfunction in children with type 1 diabetes using FE measurements.

Method: A total of 43 children and adolescents (20 boys, 23 girls, mean age 10 years) with type 1 diabetes were consecutively included in this prospective study. We screened for FE deficiency and diagnosed severe exocrine dysfunction if FE was <100 μg/g, moderate exocrine dysfunction if FE was between 100–200 μg/g, no dysfunction if FE was >200 μg/g.

Results: FE was normal in 40 patients (93%), mildly decreased in two patients (4.7%) and severely decreased in one patient (2.3%). All three patients had no gastrointestinal complaints. The child with severely decreased FE was further investigated to exclude other diseases causing exocrine pancreas dysfunction such as cystic fibrosis, Shwachman-Diamond syndrome and celiac disease. Abdominal ultrasound showed an atrophic pancreas without fatty infiltration. Pancreatic exocrine enzyme substitution was introduced.

Conclusions: In our cohort, the prevalence of pancreatic exocrine deficiency (moderate and severe) in children with type 1 diabetes was low, at 7%. In the patient with the lowest FE level, a genetic defect, such as mutation in the Hepatocyte Nuclear Factor 1 beta (HNF1β) gene (MODY 5) should be considered. A mutation in the Carboxyl-Ester Lipase (CEL) gene (MODY 7) is not likely to be the cause, since pancreatic lipomatosis, a hallmark of this disease, was absent. Diagnosis of type 1 diabetes should be revisited in children with diabetes and severe pancreatic exocrine dysfunction.

P/186/WED

Genetic testing in patients with a clinical diagnosis of maturity-onset diabetes of the young (MODY) – the Australian experience

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Objectives: Maturity-onset diabetes of the young (MODY) affects about 2–5% of individuals with diabetes. In 2005, molecular genetic testing for GCK, HNF1A and HNF4A, was introduced by Mater Health Services, the only laboratory in Australia to offer these tests. We report our experience in molecular diagnosis and identification of MODY.

Methods: Testing of all three genes was carried out by bidirectional DNA sequencing and Multiplex ligation dependent probe amplification (MLPA). The probands' clinical information were obtained through discussions with their treating doctors and review of medical charts. Relevant biochemistry results were obtained through various laboratories where probands had attended.

Results: The number of requests for testing has increased steadily from nine in 2005 to 53 in 2008. Out of the 50 patients referred to our laboratory for testing, 15 were found to have 13 different sequence variations. In addition 16 family members have also been tested. Two sequence variants were found in HNF4A, including one novel mutation; eight were found in GCK, including three novel mutations; and three previously described mutations were found in HNF1A. Thus of the probands, 20% have HNF4A, 53% have GCK and 27% have HNF1A. There was a 71% positive detection rate for MODY mutations in patients with a family history of diabetes and absence of pancreatic auto-antibodies.

Conclusion: The majority of probands had an autosomal dominant pedigree and all had absence of pancreatic auto-antibodies. The relative frequency of MODY subtypes within Australia may differ as our results only relate to patients clinically referred for genetic analysis. Given the important implications of confirming the clinical diagnosis of MODY and identifying the specific MODY subtype we believe that genetic testing should be more widely utilized in patients with an autosomal dominant pedigree who are negative for pancreatic autoantibodies.

P/187/WED

An unexpected change of the treatment in children with permanent neonatal diabetes

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Introduction: Neonatal diabetes mellitus is rare, and until recently, most forms of permanent neonatal diabetes required lifelong subcutaneous insulin for management.

Objective: Transition from subcutaneous insulin therapy to oral sulfonylurea therapy in the in-patient setting was assessed in 4 patients with history of intrauterine growth retardation (IUGR); hyperglycemia, glycosuria, osmotic polyuria, severe dehydration, and failure to thrive, and the diagnosis of neonatal diabetes.

Methods: Initial therapy with insulin corrected the hyperglycemia and allowed for catch-up growth. All these families had problems with rapid fluctuations in blood glucose levels on insulin regimen with twice-daily Detemir. Because of hypoglycemic episodes, it was difficult to introduce much fast-acting insulin. Despite the lack of genetic diagnosis, these patients were managed with a sulfonylurea glyburide (glibenclamide).

Results: Our patients needed low doses of both insulin before transfer (0.4 units $\times$ kg (-1) $\times$ day (-1); and sulfonylureas after transfer (0.50–0.30 mg $\times$ kg(-1) $\times$ day(-1). HgbA1C decreased from 8.2% on insulin to 6.5% on sulfonylureas. Glibenclamide (glyburide) treatment was started at 4, 6 and 9 months and 4 years of age and resulted in insulin being discontinued, lower overall glycemia, reduced glucose fluctuations and reduced hypoglycemia. Good control is still maintained after the discontinuation of insulin, despite a reduction in the glibenclamide dose, from 0.5 to 0.3 mg $\times$ kg(-1) $\times$ day(-1) in one patient.

Conclusions: Oral sulfonylurea therapy was safe and effective in our patients and may successfully replace treatment with insulin injections, without significant side effects or increased hypoglycemia. We assume that they carry mutations in *KCNJ11* or *ABCC8* genes, the only ones that can be treated long term with oral sulfonylureas. Early molecular diagnosis is important in patients with neonatal diabetes, because the treatment with sulfonylureas could be started earlier.

P/188/WED

Smooth transition to glibenclamide treatment in an Egyptian child with permanent neonatal diabetes due to KCNJ11 (Kir6.2) mutation

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Introduction: Neonatal diabetes may be defined as insulin-requiring hyperglycemia that is diagnosed within the first three months of life. It may be either transient or permanent that requires treatment for life. Conditions that cause neonatal diabetes have been identified. The pancreatic ATP-sensitive potassium channel is a critical regulator of beta-cell insulin secretion. Mutations in the *KCNJ11* gene have recently been found to cause diabetes in the neonatal period or early infancy. Such mutations account for 30 to 58% of cases of permanent diabetes diagnosed in patients under six months of age. Diabetes results from impaired closure of K_{ATP} channel in response to increased

intracellular ATP. Sulfonylurea closes the K_{ATP} channel by an ATP-independent route and hence stimulates insulin release.

Aim: To assess the efficacy of oral Sulfonylurea in an Egyptian child with permanent neonatal diabetes after switching from insulin injection.

Case report: Our patient presented at age of 5 weeks with hyperglycemia (656 mg/dl) and Ketoacidosis (pH: 6.99, HCO_3: 6.5, Acetone :++) HbA1c = 10.2%, C-peptide <0.5 ng/ml .Initially continuous I.V. insulin infusion was given. Afterwards, R +NPH insulin in 3 daily doses; he was normoglycaemic at 2.25 IU/day. No other medical problems .His follow up HbA1c ranged from 7.2–8.9% and insulin dose 0.63–0.78 (U/kg/day).At age of 4.5 years Genetic screening of the Kir6.2 gene using PCR revealed mutations at R201H. Insulin therapy was switched to oral Glibenclamide tablets started at 0.05 mg/kg/12 hour and insulin therapy could be terminated after 6 weeks. He is now on 0.46 mg/kg/day (7.5 mg/day), HBA1c 6.8%, optimal glycemic profile.

Conclusion: The first permanent neonatal diabetes patient in Egypt was found to have a genetic defect impairing *KCNJ11* gene. Low dose of Glibenclamide could sustain a good metabolic control with marvelous improvement in quality of life after stopping insulin injections.

P/189/WED
Wolcott-Rallison syndrome in a Brazilian child with neonatal diabetes mellitus

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Neonatal diabetes mellitus (NDM) is a rare condition defined as persistent hyperglycemia occurring within the first 6 months of life. Heterozygous activating mutations of KCNJ11 and ABCC8 are responsible for approximately 50% of permanent NDM (PNDM) but defects in several other genes (INS, IPF1, GCK, HNF1B, FOXP3) have also been implicated.

Objective: Here we describe a Brazilian child with PNDM and Wolcott-Rallison syndrome (WRS) due to a novel mutation in EIF2AK3 gene.

Subject and methods: A eight and half-year-old boy, born from first-degree cousins, was diagnosed with DM at two months of age and since then he has been in insulin therapy. Anti-insulin, IA2 and GAD autoantibodies were negative. Central hypothyroidism was identified at that time. At the age of 2 years, he fractured the tibia after a fall, bone X-ray demonstrated spondiloepiphiseal dysplasia and diffuse osteopenia. Clinical diagnosis of WRS was established. At the age of 6 years, type 4 renal tubular acidosis was identified and, six months later, he had an episode of acute hepatic failure triggered by an acute viral infection, with spontaneous recovery. Viral hepatitis was excluded. He also presents developmental delay with mild mental retardation and short stature with height of 95 cm (-6.6 SDS) and body weight of 15 kg (-5.68 SDS).

Results: Sequencing of the EIF2AK3 gene in genomic DNA extracted from peripheral lymphocytes demonstrated a homozygous C > T replacement at base pair c.1192, generating a stop codon at position 398 (Q398*). Both parents were found to be heterozygous for this mutation.

Conclusions: WRS (OMIM 226980) is a rare, autosomal recessive disorder and to date, only around 40 cases of WRS have been described. The clinical phenotype can be variable, but a combination of neonatal diabetes mellitus, multiple epiphyseal dysplasia, osteopenia, developmental delay, and hepatic and renal dysfunction are typical. This is the first case of WRS reported in Brazil.

P/190/WED
Metabolic control in a case of permanent neonatal diabetes. insulin versus sulphonylurea

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Aim of this case presentation is to compare insulin versus sulphonylurea therapy in permanent neonatal diabetes mellitus (PNDM). A particular case of diabetes mellitus (DM) with onset in early infancy is presented. B. Sebastian 3 years old was first admitted in our hospital hospital at the age of 3 months with the diagnose of DM. His familial history revealed: No familial history of diabetes; Second child, gestational age = 36 weeks; Birth weight = 2550 g; The child was exclusively breast fed until the age of 3 months then mixed. History of present illness: At 3 months diagnose of DM with ketoacidosis was established. The HbA1c at onset was 15.2%. The patient received insulin therapy in a multiple injection regimen. Insulin therapy was then switched to a regimen of 2 injection, using Levemir. Insulin treatment lasted 7 months. Under insulintherapy, poor glycemic control was obtained-high glycemic variations (54–437 mg/dl), frequent hypoglycemias, average glycemic value 129 ± 60 mg/dl, HbA1c 12.1% after 1 month and 7.8% after 7 months of insulintherapy. At 10-months old, based on clinical arguments for PNMD the child was successfully switched to sulphonylurea treatment (1.8 mg/kg/d in two prises). The insulin injections were progressively reduced in 3 days after beginning of the oral therapy.The clinical and metabolic improvement was excellent without hypoglycaemias. After six months of sulphonylureas: HbA1c is 6.6%: basal glycaemia 113 ± 32 mg/dl, preprandial 143.38 ± 95 mg/dl and postprandial glycaemia 124.35 ± 76 mg/dl, small glycemic variations 37.43 ± 49 mg/dl. Diabetes control is obtained with sulphonylurea (0.16 mg/kg/d – 3 doses).At the age of 3 years genotyping confirmed the diagnose of PNMD. Further parental genetic tests are being performed.

Conclusions: The aetiology of DM with onset before 6 months of age is genetic.The metabolic balance obtained is superior under sulphonylurea therapy. It is the first case of PNDM treated with oral antidiabetes in Romania.

P/191/WED
The challenges of diagnosis and treatment of MODY1 teenage girl

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We present a 19-year-old Bulgarian girl, born with normal weight and length with unknown family history. At the age of 16 she was referred to us because of progressive diabetic symptoms for 3 months, weight loss of 6 kg despite her increased appetite, fasting blood glucose levels over 9.0 mmol/l, HbA1c 9.1% without tendency to ketoacidosis. She had normal physical, pubertal and mental development. Her BMI was 20 kg/m^2, with no signs of insulin resistance. After the admission her BGL varied from 10.0 to 21.8 mmol/l, normal electolytes, renal and liver function, dyslipidemia with increased triglycerides. The first urine analysis showed mild glucosuria, without ketonuria or proteinuria. At the time of diagnosis, her C-peptide level was in the normal range 1008 pmol/l

(170–980), and the autoantibodies (GAD65, IA2, IAA) were negative. Insulin therapy was started with rapid and long-acting insulin analogues (1 IU/kg BW). In 1.5 months the insulin therapy was ceased gradually after confirming the lack of autoimmunity and oral treatment with Glipizide was initiated. After 1 month of SUR treatment, her HbA1c decreased to 6.9%, but she complained of midday hypoglycemia as low as 1.9 mmol/l. She then continued the therapy with Diaprel SR, diet and physical activity. In 2-years period her HbA1c varied between 6.9 and 7.1, sometimes up to and 9.5%, because of dietary mismanagement. Urine analyses remained normal. The age of the patient, the clinical signs with the lack of obesity, insulin resistance, tendency to DKA, and the absence of autoimmunity and glucosuria were our diagnostic criteria for MODY1 diabetes. In 2009 a genetic sequencing analysis was performed and an HNF4A mutation (R244Q) was confirmed. This mutation up to now has been reported only in 2 other families. The diagnosis is important because our patient is pregnant and the baby is at greater risk of macrosomia and neonatal hypoglycemia, which raises further problems with the management of her diabetes.

P/192/WED

Case report from Egypt: the use of continuous subcutaneous insulin infusion in neonatal diabetes with glucokinase mutation

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Preterm baby weighing 1200 gm with intrauterine growth retardation; born to a mother with gestational diabetes; entered the Neonatal Intensive Care Unit (NICU) and during the 1st week, her blood glucose levels showed persistent hyperglycemia without ketosis and diagnosed as a case of neonatal diabetes. Insulin was started in the NICU but with severe fluctuations and repeated hypoglycemic attacks. Two months later, the patient was referred to our university hospital and was started on continuous subcutaneous insulin infusion using (Medtronic 712 pump) resulting in minimal blood glucsoe fluctuations and minimal hypoglycemia. Genetic study was done to decide for further management and the baby turned out to be homozygous for a novel missense mutation H50D, in exon 2 of the *GCK* gene. This C > G mutation at nucleotide 148 (c.148C > G) results in the substitution of the amino acid aspartic acid (acidic charged polar) for histidine (basic charged polar) at codon 50 (p.His50Leu).

Conclusion: Continuous subcutaneous insulin infusion is effective in managing neonatal diabetes. Genetic analysis should be carried out to every case with neonatal diabetes to give proper decision about future management.

P/193/WED

The difficulties during complex treatment of secondary diabetes in patient with familiar partial lipodystrophy suspicion

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Objectives: The insulin resistance is rather rare problem in paediatric patients. Unfortunately, there are increasing number of patients who do not benefit from typical sensitizers drug treatment. The clinical problem is how to obtain or improve metabolic control in case of severe insulin resistance.

Methods: A 15-year-old girl was admitted to the hospital due to diabetes mellitus suspicion. The features of dismorphy, hirsutism, primary amenorrhea were determined. Baby born with birth weight of 2950 g. Psychosocial development was correct. In anamnesis without typical features of diabetes, sudden loss of weight, recurrent infections. In physical examination dismorphy features (bird-like face), hirsutism, lack of subcutaneous fat, weight deficit, acanthosis nigricans, clitoromegaly.

Results: Sever insulin resistance was associated with diabetes mellitus. Fasting insulin level – 30 uIU/Ml, hyperinsulinemia during OGTT > 308 uIU/Ml. Insulin secretion disorders were detected upon IVGTT and glucagon test. Anti-GAD Ab and IA2 Ab (-). The lipid disorders were present. Leptin level was normal.In the beginning patient was treated with insulin. Nowadays with insulin-sensitizing drugs like metformin and glitasone. Regardless complex treatment good diabetic control was not obtained: HbA1c min. level – 8.8%, max. level-12.2%.The girls was regularly controlled in gynecological out-door department due to primary amenorrhea in spite of correct development of pubescence. In clinical examination: lanugo and clitoromegaly (I° after Prader). In hormonal examination: hiperandrogenism (↑ testosteron level, ↑ androstendion level), basic gonadotropin and estrogen level within normal range. LHRH test indicates adolescent phase with distinct LH answer. Menarche was induced after approximately one year treatment.

Conclusions: Differential diagnosis: inherited syndromes with insulin resistance. Impression: familial partial lipodystrophy. - LMNA-FPLD2?, PPARG-FPLD3?

P/194/WED

Sulfonylurea treatment in a celiac girl with neonatal diabetes (KCNJ11 R201H): impact of low compliance to the gluten free diet

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Glibenclamide (GC) is absorbed mostly in the intestine. A celiac girl with transient/remittent neonatal diabetes mellitus due to a (R201H) KCNJ11 mutation started GC when 19.8 years old. After the age of 20.5 years, the compliance was still good to the GC but progressively worsened to the gluten free diet (GFD), paralleled by a HbA1c increase. When 22-year-old, she had constant hyperglycaemia and oligomenorrhoea. As the compliance to GFD improved, the HbA1c levels decreased despite a decrease also in GC dose, the anti-transglutaminase titre got normal values. To test the hypothesis that malabsorption could affect the GC absorption and thus the beta-cell function, an OGTT was performed when 23.7-year-old (when good compliant to the GFD) and compared with the OGTT performed when 20-year-old (similar HbA1c level, poor compliance to the GFD, higher GC dose). The new OGTT showed higher insulin levels, especially during the 1st hour (23.7 years vs. 20 years, insulin ratio: 0' 1.5, 60' 2.1, 120' 1.1; insulin to plasma glucose ratio, pmol/mmol, 20 years: 0' 2.3, 60' 1.2, 120' 1.9; 23.7 years 0' 2.8, 60' 1.7, 120' 1.7). Our case suggests that intestinal malabsorption may affect the absorption rate of GC even in absence of diarrhoea. This mechanism should be taken into consideration in the management of patients on sulfonylurea to avoid hyperglycaemia or even ketoacidosis during intercurrent gastrointestinal illness.

Age (years)	19.8	20	20.3	20.6	22	22.3	22.5	23.5	23.7
Glibenclamide (mg/kg/day)	0.39	0.41	0.51	0.51	0.40	0.34	0.34	0.35	0.35
HbA1c (%)	8.5	8.0	7.8	8.3	11.2	8.1	7.2	7.9	7.8
Antitransglutaminase antibodies (U/ml) (normal value <8.9)	13.1	not assayed	9.3	not assayed	26.7	18.0	7.6	7.9	7.7
Ferritin (ng/ml) (normal values 10–291)	2	not assayed	not assayed	not assayed	3	1	1	4	not assayed
Iron (μg/dl) (normal values 35–150)	11	not assayed	35	27	38	19	52	53	not assayed
Weight (kg)	44.2	43.7	43.5	43.5	42.7	43.2	43.2	43.5	43.5

[Follow-up data]

Poster Session II: Others I

P/195/FRI

Early detection of glucose derangements in children with cystic fibrosis under ten years of age

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Background: It has been demonstrate that diabetes significantly impairs clinical status in Cystic Fibrosis (CF) patients. Actually the glucose derangements screening in CF-patients has being performed only after ten years of age by means of OGTT.
Objective: To evaluate the prevalence of early glucose metabolism derangements in CF- patients younger than 10 years of age.
Methods: Twenty-two out of 83 CF patients < 10 years old, followed by our Regional Care CF Center, were recruited for: Fasting Hyperglycemia (1-FH) or Occasional Hyperglycemia (3-OH) or HbA1c $\geq 5.5\%$ (highest quintile: 18 patients). The non-FH patients (n = 21) underwent OGTT and Continuous Glucose Monitoring System (CGMS). All patients who did not present DM or IGT according to WHO criteria, but with glucose values ≥ 7.7 mmol during the tests were classified as abnormal glucose tolerance (AGT).
Results: Impaired glucose metabolism was found in only three patients according to WHO: 2 DM and 1 IGT (3.6%), while AGT was found in others 11. The total prevalence of glucose derangements in these patients is 16.9%.
Conclusions: Glucose derangements screening is indicated in CF patients also under 10 years of age.

P/196/FRI

Hypomagnaesemia is associated with poorly controlled diabetes patients in adolescents but not in children

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Objective: Research has showed that the degree of metabolic control influences serum magnesium concentrations in young patients with type I diabetes. The present study aimed in identifying differences in magnesium serum levels between children and adolescents. The hypomagnesemia in diabetes is the result of increased magnesium loss via urine, associated with hyperglycemia.
Methods: Two-hundred and sixty youngsters with type I diabetes mellitus were recruited from our outpatients Department (129 children and 131 adolescents). Blood samples were attained in fasting condition. Optimal serum magnesium levels were defined as 1.9–2.5 mg/dl and values below or above these levels were considered hypomagnesaemia and hypermagnaesemia, respectively.
Results: The prevalence of hypomagnaesemia and hypermagnaesemia were similar in both age-groups (22.5% vs. 22.1% and 3.1% vs. 2.3% respectively). Overall 74.4% of the children and 75.6% of the adolescents demonstrated optimal serum magnesium levels. No difference was observed in the mean HbA1c of each magnesium category in the children, whereas in the adolescents, significantly higher HbA1c levels were recorded in the hypomagnaesemic compared to the normal magnesium level group ($P \leq 0.008$). Between age groups, adolescents in all magnesium level category demonstrated higher HbA1c levels (Table).

Table [HbA1c levels in each magnesium category (%)]

	Children (n = 129)	Adolescents (n = 131)	*P* between age groups
Hypomagnesaemia	7.7 ± 1.0	9.2 ± 2.1	≤0.006
Optimal magnesiumlevels	7.4 ± 0.9	7.9 ± 1.7	≤0.016
Hypermagnesemia	7.1 + 0.2	9.0 ± 0.8	≤0.004

Conclusions: The results could be explained from a parental influence in glycemic control in pediatric patients that has a positive affect on HbA1c levels. On the contrary, during adolescence, the will for individual management of diabetes, appears to result in worse glycemic control. The results indicate that in children, hypomagnaesemia is not influenced by glycemic control.

P/197/FRI

Spinal muscular atrophy type I (Werdnig Hoffman Syndrome) and diabetes mellitus: are there a possible correlation in those two cases?

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Objective: Spinal muscular atrophy type I (SMA) refers to one of four autosomal recessive neuromuscular disorders characterized by degeneration of the anterior horn cells of the spinal cord, leading to symmetrical muscle weakness and atrophy. SMA is the second most common lethal, autosomal recessive disease in Caucasians after cystic fibrosis. We describe two children with SMA that initially developed obesity and after that, diabetes mellitus.
Methods and results: The first case is a girl diagnosed at 6 months after respiratory failure and hypotonic muscles since the neonatal period. She has being living at the hospital since newborn and developed muscular atrophy and a very important obesity at 11 years of age. After some days of excessive urine output, the diagnosis of diabetes was made by two high glycemic dosages (267 and 272 mg/dl), anti GAD and IA2 were negative with a C peptide level of 4.3. She was started on a restrict calorie and sugar free diet and metformin. Even loosing weight she was still hyperglycemic and only after insulin the glycemic levels were near normal. Her brother has begun the same picture around 9 years except by the fact that he was not so obese. Auto antibodies were also negative and C peptide level was 1.6. He is on insulin. There were no other cases of diabetes in the family. They were not using any diabetogenic medication.

Conclusion: We describe two siblings with SMA that developed diabetes mellitus with no detected antibodies and C peptide between normal and upper normal range. Those are the first cases of diabetes mellitus on SMA patients described at the literature.

P/198/FRI

Comparison of physical activity reported and measured in T1D and his relation to insulin requirement and body composition

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Objectives: It is considered that a regular practise of physical activity contribute to reduce insulin requirement and improve metabolic control in T1D patients. The amount, intensity and type of physical activity reported by the patients is often unreliable. Aim of the present study is to assess the real amount of spontaneous and programmed physical activity and to evaluate his impact on metabolic control and metabolic syndrome related parameters.

Methods: We study 19 T1D patients (12 boys) 7 to 21 years-old (median 14) with a disease duration 4 to 155 months (median 50), HbA1c 6.0 to 9.5 (median 7.1), insulin requirement 0.3 to 1.0 U/kg/day (median 0.74). All patient were asked to wear an Arm Band accelerometer for three consecutive days. The programmed physical activity was self-reported by a questionnaire. All recorded data were elaborated by Sense Wear Professional 6.1 software. Body composition was assessed by bio-impedance analysis and skin folds. Cholesterol, HDL cholesterol, triglycerides, blood pressure, height, weight and pubertal stages were simultaneously evaluated in all patients.

Results: The time spent doing physical activity reported by the questionnaire and measured by the accelerometer were not correlate. Body weight adjusted TEE resulted significantly correlated to the percentage of body fat mass evaluated by skinfolds ($P < 0.01$). Mean HbA1c and insulin requirement (U/kg) of the last twelve moths and metabolic syndrome related parameters did not correlate to any physical activity parameter either reported by the questionnaire or measured by the accelerometer.

Conclusions: A reliable assessment of physical activity and his putative favourable effect on metabolic control require a strict and prolonged monitoring by subjective and objective tools. Three days are a too short span to assess the real amount and intensity of physical activity practised on average by a diabetic child or adolescent.

P/199/FRI

Effect of zinc supplementation on insulin resistance and components of the metabolic syndrome in prepubescent obese children

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Objective: Because of the role of zinc in the metabolism of insulin, the present trial assessed the effect of zinc supplementation in comparison with placebo on insulin resistance and components of the metabolic syndrome in prepubescent obese children.

Methods: This triple-masked randomized, placebo- controlled cross-over trial was conducted among 60 obese Iranian children in 2008. In addition to physical examination, fasting serum Participants were randomly assigned to two groups of equal number; one group received 20 mg elemental zinc and the other group received placebo on a regular daily basis for 8 weeks. Then, after a 4- week- wash-out period, the groups were crossed over.

Results: The mean age of participants was 9.1 ± 1.1 years.After receiving zinc, the mean fasting plasma glucose, insulin and HOMA-IR decreased significantly; the mean body mass index (BMI), waist circumference (WC), LDL-C and triglycerides (TG) had a non-significant decrease. After receiving placebo, the mean FPG, insulin and HOMA-IR increased significantly, and the mean BMI, WC, LDL-C and TG had a non-significant increase.

Conclusion: Zinc supplementation might be considered as a useful and safe treatment to be added to lifestyle modification for controlling cardiometabolic risk factors related to childhood obesity.

P/200/FRI

IGFBP-1 the most sensitive and the earliest marker of growth hormone axis abnormalities in children with IDDM

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The abnormalities of growth hormone axis play a great role in IDDM patients in pathogenesis, of diabetes complications, insulin resistance, dawn phenomenon and fat disorders.

The aim of the study was the evaluation of growth hormone in urine and GHBP, IGF-1, IGF-2, IGFBP-1,2,3,6 and ghrelin in blood of prepubertal children with IDDM and estimate the influence of the kind of therapy.

Material and methods: A total of 67 patients and 15 age matched healthy children were included into the study. All children were prepubertal (T < 2), suffering for IDDM for more then two years, without any coexisting diseases. All patients were divided into groups according to the kind of therapy.22 were treated with conventional insulin therapy (CIT),21 with multiple insulin injection (MII) and 24 with continuous subcutaneous insulin infusion (CSII).There were no statistically significant differentials between groups as to the metabolic control, age, weight, height and BMI. Blood and urine samples were taken between 7.30 and 8.30 am. In hospital in normoglycemia after the night without episodes of hyper or hypoglycemia. All analysis were made by RIA or ELISA commercial kits.

Results: IGFBP-1 concentration was the only factor which different the IDDM children and control group in a statistically significant way. IGFBP-1 concentrations were falling down with the intensity of treatment (the lowest in CSII and the highest in CIT patients).

Conclusions: 1. Metabolic control is the factor with the greatest influence on the growth hormone axis. There have been proved correlations between HbA1c value and concentrations of IGF-1, IGFBP-1and IGFBP-6. 2. IGFBP-1 is the earliest and the most sensitive marker of growth hormone axis abnormalities in children with IDDM. 3. Intensification of treatment influences the concentration of IGFBP-1.

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P/201/FRI
Treatment with insulin detemir or NPH insulin in children aged 2–5 years with T1DM

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This randomised, multinational, open-labelled, parallel-group trial compared one year's treatment with insulin detemir (IDet) or NPH insulin (NPH), both in combination with mealtime insulin aspart, in subjects aged 2–16 years with T1DM. Of 348 randomised subjects, 82 (23.6%) were 2–5 years, of which 42 received IDet and 40 received NPH, respectively. This abstract presents the findings in this subset of children using descriptive statistics due to the low subject number. Insulin titration targets for fasting/pre-prandial plasma glucose were 4–7 mmol/l without hypoglycaemia, while nocturnal targets were ≥3.6 mmol/l. Baseline characteristics (IDet vs. NPH) were mean age: 4.3 vs. 4.5 years, diabetes duration: 2.2 vs. 2.1 years, males: 42.9% vs. 52.5%. In the IDet group, mean HbA_{1c} remained fairly stable (8.2% at baseline vs. 8.1% at one year), while a slight increase was observed in the NPH group (8.1% at baseline vs. 8.3% at one year). FPG decreased in both groups (from 8.44 to 7.44 mmol/l with IDet and from 8.56 to 8.11 with NPH). A lower mean rate (episodes per subject year) of 24-hour hypoglycaemia was observed with IDet compared to NPH (50.6 vs. 78.3). The rate of nocturnal hypoglycaemia (22:00–07:00) was also lower with IDet than with NPH (8.0 vs. 17.4). No severe hypoglycaemic episodes were reported with IDet, while 3 subjects reported 6 episodes with NPH. Change in weight SD score standardized by age and sex was -0.17 with IDet and 0.03 with NPH. A slightly lower proportion of subjects in this age group reported adverse events with IDet than with NPH (69.0 vs. 77.5%). None of these were severe with IDet and the majority was considered unlikely related to trial product. Serious adverse events were few; (5 with IDet, 7 with NPH). In conclusion, long-term treatment with IDet in children aged 2–5 years resulted in similar glycaemic control, a lower rate of hypoglycaemia, (especially at night), less excessive weight gain and fewer adverse events compared to NPH.

P/202/FRI
Insulin analogues and toddlers with diabetes

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Introduction: Effective control of blood glucose in toddlers with diabetes can be difficult.

Unpredictable eating patterns, different levels of activity, frequent ilnnesses and rapid growth spurts, along with the difficulties associated with prolonged nocturnal fasting or food refusal are the major factors that impact on blood glucose levels at this age.

Objective: To describe a case series of 14 patients under 3 years of age treated with a pre- or post- meal short-acting analog insulin in conjunction with glargine insulin before bed.

Material and method: Our previous rule was to administer free-mixing insulin, once or twice daily. Due to difficulties with unpredictable blood sugar control at this age, we decided to use a multiple-injection regimen in 14 toddlers with diabetes.

Results: At initial presentation, out of 14 patients, 12 were diagnosed with diabetic ketoacidosis and 3 with cerebral oedema. HbA1c at diagnosis was between 8.5 and 10.2%. Other characteristics in this age-group: a rapid and severe presentation, a shorter duration of symptoms, less then a month, a reduced duration of the partial remission phase (1–3 months), absent in 4 patients, higher insulin requirements in the first 6 months after diagnosis. All had extremely variable blood sugar control with unpredictable fluctuations. The patients were started on Novorapid, three times a day with meals with glargine at bedtime. Soon after this change, the HbA_{1c} fell from 10.2 to between 6.1 and 7.2% and there were fewer fluctuations in blood glucose and less hypoglycemic episodes. The possibility to give insulin after meals' allowed the timing of meals to be much less critical for both children and parents; we encouraged a regular meal pattern with complex carbohydrate-based meals to reduce the risk of hypoglycemia.

Conclusions: Using the newer insulin analogues represents a more targeted therapeutic and physiological approach to diabetes management in toddlers and should be strongly encouraged.

P/203/FRI
The challenge of insulin and other problems of children with diabetes in Arua-Uganda

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Background: Without insulin the averagely life span for a child with diabetes is maximum one year. However, children with diabetes are often unable to afford insulin.In Arua, Uganda, there are 100 diabetic children in the age from 11…. to 20… years, most of them from the 7 districts of west Nile. As part of the African culture families sometimes believe in curses and bewitching, and they tend to take the children to shrines for the first treatment, before bringing them to the Health Units. However, in the health units first priority is often given to treat Malaria, thereby postponing diabetes treatment. And not all health centers have refrigerators for insulin storage.

Method: The Arua district formed the Diabetic Association for the districts of the west Nile region and Diabetic clinics were created. Insulin is brought in by the association and made available to the members but Glucometers are so far provided only in a few districts.

– Currently we have about 50 trained health workers in 11 diabetes clinics in west Nile region.

Health workers give diabetic talk how to inject insulin. Since most of the communities believe children do not get diabetes, radio broadcasts are given to improve the general awareness once in while is not yet enough to preach the gospel of Diabetes in children in Arua.

Results: About 80% children still die undiagnosed with Diabetes.

– Most parents and guardians see diabetes in children as an expensive burden and as a result they are not well looked after, hence about 90% dying at younger age. When inviting parents to come for diabetic education, they in most cases tend to send their children alone.

Conclusion: Diabetes in children is still a huge problem in Arua due to lack of insulin, about 100% still miss insulin, only districts hospital provide insulin which is not enough Parents, health workers, and stake holders in the government need to work together in order to make insulin available to all diabetic children.In all the Hospitals and Health C.

P/204/FRI
The Role of Reg1 in the regulation of AMP kinase in yeast

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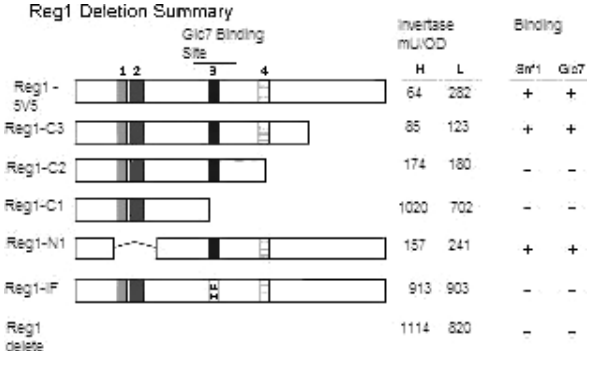
Objective: Function of AMP-activated protein kinase AMPK is mediated by phosphorylation of its activation loop. Studies of mammalian and yeast AMPK show that the dephosphorylation reaction is the regulated step. In yeast, AMPK dephosphorylation is mediated by PP1 phosphatase in complex with a regulatory protein: Reg1. Reg1's role is poorly understood. We generated specific mutations in Reg1 to clarify its role in regulating yeast AMPK.
Method: We made targeted deletions of conserved domains in Reg1. Their impact on AMPK function was measured. We also made point mutations in a conserved motif known to be needed for PP1 binding. Reg1 function was measured by determining AMPK signaling outputs. Then, we used co-immuno-precipitation assays to measure the ability of Reg1 to bind AMPK and PP1.
Results: Deletion of conserved domains of Reg1 caused dysfunction in AMPK, supporting the idea that PP1/Reg1 complex is needed for regulation. Deletions interfering with PP1 binding caused hyperactivation and hyperphosphorylation of AMPK. Genes whose expression is under control of AMPK were deregulated. In contrast, deletion of the C-terminal 278 amino acids had no effect on Reg1 function; therefore this region is dispensable for Reg1 function. Surprisingly, we found evidence that AMPK and PP1 bind a common surface of Reg1, as all deletions interfering with Reg1 binding to PP1 also interfered with Reg1 binding to AMPK, and point mutations in the PP1 binding motif also blocked binding to AMPK.
Conclusion: This study helps clarify the role of Reg1 in regulating AMPK. We show that mutations interfering with Reg1-PP1 binding also disrupt Reg1-AMPK binding. This suggests that competition between PP1 and AMPK for Reg1 binding may be central to the regulation of AMPK. Further study of Reg1 function in relation to AMPK may help formulate drugs which would directly control it to treat obesity, type 2 diabetes mellitus, and the metabolic syndrome more effectively than Glucophage.



[Reg1 Mutant Result Summary]

Poster Session I: Others II

P/205/WED
Urinary C-peptide/Creatinine ratio is a novel practical approach for identifying paediatric diabetic patients with endogenous insulin production

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Introduction: Serum and 24-hour urinary C-peptide are useful for measuring endogenous insulin secretion but both have practical limitations.
Aim: To assess urinary C-peptide creatinine ratio (UCPCR) in a single urine sample examining stability, correlation with 24 hour UCP, discrimination between subtypes and identification of diabetic children with endogenous insulin production.
Methods: 1) Stability of UCPCR was assessed and correlated with 24-hour collections in 21 adult controls. 2) Cutoff levels for diagnostic discrimination were assessed in 21 adults with Type 1diabetes, (T1D; <30 year, diagnosed >3 year, insulin since diagnosis), 45 with T2D (>35 year, no insulin for 1 year), and 18 with HNF1A MODY. 3) In 36 pediatric diabetic patients these cutoff levels were used to identify non-T1D and endogenous insulin secretion early in T1D.
Results: 1) UCPCR was stable at room temperature for 24-hour, 72-hour in boric acid and 72-hour at 4°C. 2nd void fasting UCPCR correlated with 24-hour UCP (r = 0.8, $P < 0.001$). 2) UCPCR was lowest in T1D and highest in T2D:T1 (median (IQR) < 0.01 (< 0.01 – < 0.01), T2 2.4 (1.1–3.7), HNF1A 0.6 (0.4–1.0); $P < 0.00001$). UCPCR < 0.2 had 95% sensitivity and specificity for discriminating T1D. 3) 5/5 (100%) paediatric patients with non T1D had UCPCR > 0.2. 13/31 (42%) with T1D had UCPCR > 0.2. Patients with UCPCR > 0.2 had shorter duration of diabetes (median (IQR) 0.5 (0.03–1.7) vs. 4.8 (3.3–7.5) $P < 0.001$), lower insulin dose (0.8 (0.7–0.9) vs. 1.0 (1.0–1.2) $P = 0.011$) and older age of diagnosis [9.7 (6.0–12.5) vs. 5.6 (1.9–8.3) $P = 0.006$].
Conclusions: UCPCR is a stable, non-invasive measure that correlates with 24-hour UCP in controls. UCPCR can differentiate between subgroups of diabetes in adults. In children preliminary studies show a UCPCR > 0.2 can detect non Type 1 diabetes and can detect early endogenous insulin secretion in the first year following diagnosis. UCPCR has the potential to become a simple easily performed measure of persistent endogenous insulin production and warrants further investigation.

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Use of dried blood spots for the estimation of genetic risk in type 1 diabetes mellitus (T1DM)

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Objective: T1DM incidence has increased worldwide over the past 30 years, expecially in children at early age. The major risk of developing T1DM is carried by genes of HLA complex. Newborn screening programm are based on dried blood spot (DBS) from capillary blood taken at 5th day. DBSs are easy to store, handle and well accepted. We evaluated a new assay based on time-resolved fluorometry to identify HLA alleles related to T1DM.

Methods: DBSs samples from 256 newborns were tested for HLA DRB1 and DQB1 alleles using time-resolved fluorimmunoassay method. Results were compared with those from two multicenter Italian studies aimed to identify subject at risk of T1DM and to assess prevention strategies (DIABFIN and PREVEFIN).
Results: Among the 176 newborns belonging to the first group (DIABFIN project) 6 subjects were classified as high risk for T1DM, 99 as moderate risk and 71 were classified as low risk.
All subjects belonging to the second group (PREVEFIN project) were classified as low risk.
The results obtained in blind by DELFIA® on DBSs were similar to those obtained by DIABFIN and PREVEFIN.
Conclusions: DELFIA® method for genotyping on DBSs showed an excellent sensitivity, specificity and efficiency compared with conventional techniques. Moreover, this assay is less expensive, and it can be easily performed on material already collected for newborn screening programs.

P/207/WED
Postprandial glucagon levels associate with glycaemic control in Danish children and adolescents with new onset type 1 diabetes

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Glucagon release is often perturbed in patients with type 1 and type 2 diabetes leading to a state of hyperglucagonaemia. The role of hyperglucagonemia on metabolic control is not fully understood. The aim of this study is to investigate the role of glucagon on glycaemic control as assessed by stimulated blood glucose, HbA_{1c} and insulin dose adjusted HbA_{1c} ($IDAA_{1c}$) during the first 12 months after diagnosis. A total of 130 Danish children with newly diagnosed type 1 diabetes were followed for 12 months. A 90-minutes Boost-test was carried out at 1, 3, 6, 12 months after diagnosis to characterise the residual beta- and alfa cell function. Stimulated glucagon, HbA_{1c} and $IDAA_{1c}$ were analysed in a repeated measurement model with stimulated blood glucose, gender, age and stimulated C-peptide as explanatory factors. $IDAA_{1c}$ was defined as: $IDAA_{1c} = HbA_{1c}$ (%) + [4 × insulin dose (U/kg/24hour)]. The postprandial levels of glucagon were highly associated with the rise in postprandial glucose levels ($P = 0.0001$). We also observed a significant positive association between postprandial glucagon levels and both HbA_{1c} (est.: 0.18, $P = 0.02$) and $IDAA_{1c}$ (est.: 0.24 and $P = 0.03$). In a multiple regression analyses for each visit alone we found no significant relationship of glucagon and stimulated blood glucose at 1 month. However, by 3, 6 and 12 months after diagnosis where the residual beta cell function progressively decrease the rise in postprandial glucose was associated with increased glucagon levels (est.: 2.55, 2.78, 3.08 with corresponding *P*-values: < 0.0001, 0.0191, 0.0016). Postprandial glucagon levels associated significantly with HbA_{1c} at 3 and 6 months ($P = 0.05$ and < 0.0001) after diagnosis and with $IDAA_{1c}$ at 6 months (0.0052). The rise in postprandial glucose associates with postprandial glucagon levels. Our data suggest that postprandial glucagon associates with worsening of the glycaemic control. Therapies aimed at blocking the effects of glucagon might improve glycaemic control.

P/208/WED
Withdrawn by author

P/209/WED
Prevalence of celiac disease in a large cohort of young type1 diabetic patients in Belgium

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Objectives: To analyse in a cohort of patients with type 1 diabetes (T1D) the prevalence of celiac disease (CD) proved by biopsy, the ages of onset of T1D and CD, the clinical symptoms, the HLA-DQ genotype.
Methods: A total of 798 T1D (412 < 18 years old and 386 > 18 years old) are followed from the onset of diabetes. Yearly, every patient was screened for thyroid antibodies (AB), striated muscle AB, glomerular basal membrane AB, intrinsic factor and antinuclear factor and for celiac markers [antigliadine immunoglobulin (Ig) A, antigliadine IgG (AGG), IgA antiendomysium (EMA)]. In case of EMA positivity or AGG positivity with IgA deficiency, a jejunal biopsy was performed.
Results: CD was proved in 19 patients (prevalence: 2.38%). CD was diagnosed before the onset of T1D in 3 patients. In the other 16 patients, T1D was diagnosed at a mean age of 5 year 2 month and CD occurred after a mean 6 year 9 month after the onset of T1D. CD was diagnosed before 18 year except in 2 patients. The sex ratio was 1/1. HLA haplotype DR 3 was found in 94% of patients and 50% were homozygous for DR 3. The heterozygous HLA DQ genotype DR3/DR4 was found in 31% of cases. One patient had clinical symptoms at diagnosis of CD. Once the diagnosis of CD was confirmed, three patients reported some digestive symptoms, and three other reported to feel better with a gluten free diet. Among the 19 patients with CD, 47% had a concomitant autoimmune disease or associated auto-AB. Anti-thyroid AB were documented in 21% of patients, anti-nuclear AB were present in 21% and two patients suffered of polyarthritis (10%).25% of the cohort presented at diagnosis of CD a concomitant infection by helicobacter pylori infection. 50% of the patients followed a strict a gluten free diet and the celiac markers became negative within the first few months of the follow up.
Conclusion: To our knowledge, the originality of this longitudinal study is an annual screening for CD and associated auto-immune diseases since the onset of T1D.

P/210/WED
Can T2*magnetic resonance imaging predict the onset of diabetes in beta-thalassemia major?

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Objectives: The study aimed to evaluate pancreatic iron overload by T2*MRI in young beta Thalassemia major patients and to correlate it with glucose disturbances, serum ferritin and hepatic sidrosis.
Methods: Forty thalassemic (mean age 14 ± 3.19 years) patients (20 non diabetic thalassemic patients, 10 diabetic thalassemia patients, and 10 thalassemics with impaired glucose tolerance (IGT) were recruited from Pediatric Hematology Clinic, Ain Shams University, Cairo, Egypt in addition to 20 healthy age and

sex matched controls (mean age13.6 ± 2.39 years). In addition to clinical assessment, laboratory investigations included complete blood count, Hb electrophoresis, liver function tests, serum ferritin and glucose tolerance test. T2*MRI was performed with 1.5 T scanner on pancreas and liver.

Results: Significant reduction in T2*signals of liver and pancreas was shown in thalassemic patients compared to controls ($P < 0.0001$). Both diabetic thalassemics and thalassemics with IGT showed significantly lower T2*signals of pancreas compared to thalassemics with normal glucose tolerance or controls ($P < 0.001$, $P < 0.0001$respectively).However, no significant difference was shown between diabetic thalassemics and thalaasemics with IGT ($P > 0.05$). Significant correlation was present between T2*values of liver and pancreas in studied patients ($P < 0.05$).

Conclusion: T2*MRI can predict iron deposition in the pancreas. Follow up of thalassemic patients using pancreatic T2*MRI may help to prevent the development of overt diabetes by intensive iron chelation therapy.

P/211/WED

A comparison of clinical and hormonal profile of PCOS between adolescents with or without type 1 diabetes mellitus – a pilot study

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In women with type 1 diabetes mellitus (T1DM) nonphysiologic insulin replacement therapy and hyperglycemia may affect pituitary-ovarian axis and ovarian function leading to menstrual disturbances and polycystic ovary syndrome (PCOS).

The aim of our study was to evaluate hormonal profile of adolescent girls with T1DM and compare it to non-diabetic controls.

Methods: We studied: 24 adolescent girls with T1DM using intensive insulin treatment (mean HbA1c 7.0 ± 0.58%) – 6 meeting the criteria of PCOS (T1DM-PCOS group), 18 without PCOS (T1DM group), 10 healthy adolescent girls with regular menses (control group) as well as 17 adolescent girls with PCOS without T1DM (PCOS group). In all girls basal and GnRh analogue stimulated (Dipherelin 0.1 mg, s.c.) levels of androgens, estradiol and gonadotropins were measured and pelvis ultrasound was performed.

Results: In T1DM group compared to control group menarche occurred 12 month later (13.0 ± 1.1 vs. 12.0 ± 0.9 year, $P = 0.03$). Moreover significantly lower basal LH, basal and stimulated DHEAS level as well as LH to FSH ratio were observed in T1DM group compared with control group (2.3 ± 1.4 mIU/ml vs. 5.0 ± 6.0 mIU/ml, $P = 0.03$; 146.0 ± 58.0 mg/dl vs. 229.0 ± 27.2 mg/dl, $P = 0.02$; 174.9 ± 67.4 mg/dl vs. 256.1 ± 66.8 mg/dl, $P = 0.01$; 0.48 ± 0.38 vs. 0.93 ± 0.73, $P = 0.02$, respectively). There were no significant differences in hormonal profile between T1DM-PCOS group and PCOS group except significantly lower basal and stimulated DHEAS level in girls with T1DM and PCOS compared to girls with PCOS (162.0 ± 58.0 mg/dl vs. 250.0 ± 42.6 mg/dl, $P = 0.09$; 175.6 ± 72.4 mg/dl vs. 303.0 ± 94.5 mg/dl, respectively). It is concluded that hormonal disturbances as well as delayed menarche can occurred in adolescent girls with T1DM despite intensive insulin treatment and good metabolic control. However the hormonal profile of adolescent girls with T1DM and without TIDM meeting the criteria of PCOS seems to be not very different.

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P/212/WED

A case of methylmalonic acidemia mimicking diabetic ketoacidosis in an infant

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Background: Methylmalonic acidemia (MMA) is an inherited organic acidemia usually present with recurrent episodes of acute illness. A typical episode is ushered in with ketonuria and vomiting, followed by acidosis, dehydration and lethargy, leading in the absence of aggressive treatment, to coma and death. We report an infant girl with MMA presented with diabetes symptoms.

Case report: A 13-months old girl complained of polydipsia, diuresis and loss of weight. There was consanguinity between her parents. Her height was 75 cm (25–50p), weight was 7.8 kg (3–10p). She had clinical sings of diabetic ketoacidosis such as dehydration, deep sighing respiration, smell of ketones, lethargy and vomiting. Blood glucose was 482 mg/dl, venous pH: 7.0 and HCO_3: 3.3 mmol/l. Severe ketonuria was found. She was treated with parenteral fluid, electrolyte and insulin infusion. After insulin infusion, subcutaneous insulin was started and it was stopped due to hypoglycemia in a week. Two days after her discharge, after having a meal rich of protein, she was brought unconscious with hepatomegaly, severe acidosis (pH: 7.06, HCO_3: 5.7 mmol/l), increased anion gap (32), ketonuria and mild hyperammonemia (61 mmol/l). The absence of hyperglycemia and the presence of neurologic findings suggested organic acidemia. MMA was diagnosed because of metil malonic aciduria and elevated C3 carnitine esters. Cranial MRI revealed increased uptake of radiocontrast material in the basal ganglia bilaterally. The patient is still treated with low-protein diet, cyanocobalamin and L-carnitine. Her neurologic regression was particular in motor movements as shown by Denver test.

Conclusion: We emphasized the importance of including the organic acid analysis in urine among the first line exams in acutely ill children with severe acidosis. The definitive diagnosis is important because it may allow a specific treatment and a favorable evolution to prevent the sequelae.

P/213/WED

Bone age corresponds to chronological age at onset of type 1 diabetes in youth

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Introduction: There are only few data on skeletal maturation in diabetic children and these are controversial: bone age (BA) has been reported advanced or delayed. The aim of this study was to compare chronological ages (CA) and BA and to evaluate the impact of glycated hemoglobin (HbA1c) on BA at diagnosis of type 1 diabetes.

Methods: This study included 496 diabetic patients [age 8.7 ± 4.0 years (mean ± SD)], 289 (58%) boys and 207 (42%) girls, 376 (76%) age <12 years and 120 (24%) age ≥12 years. Standing height was measured and transformed into standard deviation score (SDS) according to the British 1990 growth references. HbA1c levels and radiographies of left hands and wrists were obtained at diagnosis of type 1 diabetes. BA was determined according to Greulich and Pyle.

Results: At diagnosis, in the whole population, CA was 8.7 ± 4.0 years (mean ± SD) and BA 8.8 ± 4.3 years, in girls

CA was 8.12 ± 4.1 years and BA 8.4 ± 4.4 years, in boys CA was 9.0 ± 3.9 years and BA 9.1 ± 4.2 years, in age <12 years CA was 7.0 ± 3.2 years and BA 7.2 ± 3.5 years, and in age ≥12 years CA was 13.8 ± 1.3 years and BA 14.0 ± 1.6 years. There was a strongly significant correlation between CA and BA in the 496 patients ($r = 0.967$, $P < 0.001$). BA corresponded to CA: Δ (BA–CA) [median (25th, 75th percentiles)] was in the whole group 0.0 years (-1.0, +1.0). There was no correlation between Δ (BA–CA) and HbA1c (*P*: NS).

Conclusions: For each group the difference between CA and BA was in the range of the standard deviations for BA. This study showed that bone maturation is normal for age and gender and independent of HbA1c at diagnosis of type 1 diabetes. These findings are compatible with the fact that the mean duration of typical symptoms of type 1 diabetes before diagnosis has been evaluated to 3 weeks in children. The short exposure to important insulin deficiency does not impair the mechanisms by which the GH-IGF-I axis allows normal growth.

P/214/WED

Overweight adolescents: a group at risk for metabolic syndrome (Tehran adolescent obesity study)

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Background: Metabolic syndrome not only is a serious problem for adults, but is also afflicting an increasing number of children and adolescents. This syndrome is a risk factor for type 2 diabetes mellitus and cardiovascular diseases. The aim of this study was to estimate the prevalence of metabolic syndrome in a sample of Iranian adolescents.

Methods: A total of 554 overweight adolescents (aged 11–17 years) participated in a community-based cross sectional survey. Anthropometric examinations including height, weight, body mass index, and blood pressure were assessed. A fasting blood sample was taken for measurement of glucose and lipid profile. Metabolic syndrome was determined by the definition released by the National Cholesterol Education Program Adult Treatment Panel III, which was modified for age.

Results: The overall prevalence of metabolic syndrome was 26.6%. There was no gender difference in the distribution of metabolic syndrome. When stratified by body mass index, 22.5% were overweight (BMI≥95th percentile) besides having the criteria for metabolic syndrome, while the remaining 4.1% of the adolescents were at risk for overweight (BMI between 85th and 95th percentile) together with metabolic syndrome. Hypertriglyceridemia was the most common and high-density lipoprotein was the least common constituent of metabolic syndrome.

Conclusion: This study suggests a high prevalence of metabolic syndrome among overweight Iranian adolescents. This poses a serious threat to the current and future health of Iranian youth.

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Reduced pain perception during injection with new pen-needle technology: a randomized double-blinded pediatric study

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Objective: To investigate if the new double-tapered NANOPASS 33 Pen Needle (NP33; Terumo Cooperation, Japan) causes less pain during injection as compared with an established pen needle.

Methods: A randomized study was performed in 96 patients (63 male; mean age (±SD) 14.6 ± 3.0 years, diabetes duration 5.9 ± 3.9 years). An unblinded study nurse performed six pen injections per patient with or without test medium (Diluting Medium, Novo Nordisk; 0.1 U/kg) using NP33 and customary needles (CF6; Clickfine universal 6, Ypsomed, Switzerland) in a randomized sequence on both thighs. The quantity of injection site leakage was captured by filter paper (mean diameter). Subjective pain perception was assessed using a visual analog scale (VAS, 0–100 mm; 100 very painful) with both, patient and investigator, being blinded to the study procedure. VAS scores of both thighs were averaged and given as mean ± SEM. Differences in pain perception and leakage were assessed by paired t-test.

Results: Applying injections with test medium, the VAS pain ranking was 16.8 ± 1.7 with NP33 vs. 18.2 ± 1.9 with CF6 ($P = 0.164$). VAS scores were 16.1 ± 3.7 vs. 25.6 ± 4.0 ($P = 0.008$) in children younger than 12 years, 12.5 ± 2.5 vs. 19.2 ± 3.1 ($P = 0.056$) in those with diabetes duration <3 years, and 12.0 ± 1.8 vs. 17.5 ± 2.9 ($P = 0.037$) in children with multiple daily injections (NP33 vs CF6, respectively). Without test medium, no significant differences were found between NP33 and CF6. Post-injection leakage was comparable with both needles (2.8 ± 1.8 mm vs. 2.6 ± 1.9 mm, $P = 0.214$) and not correlated with pain ranking. With both needles, neither technical problems nor adverse events were reported.

Conclusion: Concerning application and safety, the quality of the new needle is as high as in a commonly used one. Our data indicate, however, that the usage of the double-tapered needle is of clinical advantage in pediatric patients to reduce sensation of pain during injection.

The study was supported by an unrestricted grant from Terumo Europe N.V.

P/216/WED

PCOS and hyperandrogenic disorders – a problem in adolescent girls with type 1 diabetes mellitus and good metabolic control

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In adult women with type 1 diabetes mellitus (T1DM) increased prevalence of hirsutism and polycystic ovary syndrome (PCOS) connected with poor glucose level control have been described. The aim of our study was to estimate the prevalence of PCOS and its components in adolescent girls with T1DM with respect to their metabolic control.

Methods: A total of 24 adolescent girls with T1DM (mean age 15.8 ± 1.2 years, mean gynecological age 33.0 ± 10.7 months, mean diabetes duration 6.6 ± 3.73 years, mean HbA1c for the whole treatment 7.0 ± 0.58%), treated with multiple insulin injections (62.5%) or insulin pump (37.5%), were studied. In all girls, evaluation of hirsutism and menstrual disorders were performed and basal as well as GnRh analogue stimulated (Dipherelin 0.1 mg, s.c.) levels of androgens and gonadotropins were measured. PCOS was diagnosed according to ESHRE/ASRM criteria.

Results: Six (25%) girls fulfilled the criteria of PCOS and some components of PCOS were found in another 6 (25%) girls [menstrual disturbances in 1 (4%), hirsutism in 1 (4%), polycystic morphology of the ovaries in 2 (8%), elevated testosterone and/or androstenedione level in 4 (16%)]. There was also a significant correlation between increase in testosterone level after stimulation and BMI z-score ($r = 0.54$, $P = 0.026$).

Relationship between PCOS occurrence and the type of insulin therapy, T1DM duration, daily insulin dose per kg, mean HbA1c for the last year and the T1DM's span was statistically insignificant. However, significant correlations between stimulated testosterone level and mean HbA1c for the last year ($r = 0.61$, $P = 0.006$) and mean HbA1c for the T1DM's span ($r = 0.47$, $P = 0.04$) was found. Surprisingly insulin pump therapy was significantly associated with polycystic morphology of the ovaries occurrence ($r = 0.55$, $P = 0.006$). It is concluded that clinical and/or biochemical components of PCOS can be found relatively often also in good metabolic controlled adolescent girls with T1DM. Supported by MNiSW *N407 015 32/0403*.

P/217/WED

Benefits of intra-peritoneal insulin administration in a child with severe insulin-induced lipoatrophy

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Objective: Insulin-induced lipoatrophy can compromise glycaemic control and reduce quality of life in children with Type 1 diabetes mellitus (T1DM). This case report describes the benefits of intra-peritoneal insulin in a child with severe insulin-induced lipoatrophy.

Results: The male patient, diagnosed with T1DM at 1.3 years, developed local inflammatory reactions to sub-cutaneous insulin injections within the first 6 months of treatment. The injection sites eventually developed lipoatrophy. A range of insulin preparations, including administration via continuous subcutaneous infusion (CSCI), were trialled without success. Local co-administration of dexamethasone also did not result in any long-term improvement. Pork insulin, either via CSCI or multiple daily injections, was associated with less lipoatrophy than previous insulin protocols. However CSCI sites often lasted <48 hours and were often associated with abscess formation. An increasing HbA1c (11.6%) combined with difficulty delivering insulin subcutaneously resulted in a trial of intraperitoneal insulin delivered by a Diaport. DiaPort® (Roche Diagnostics – not yet approved for routine use in Australia) is a device implanted in the abdominal wall to which a replaceable peritoneal catheter is attached on one side and a portable insulin pump is linked on the other side. The insulin pump was used to deliver U-100 Insuman® Regular insulin (Sanofi-Aventis, Paris, France) according to standard pump guidelines. This led to a dramatic improvement in glycaemic control (HbA1c 8.4%) and improved quality of life.

Conclusion: The intra-peritoneal route of insulin administration should be considered when severe insulin-induced lipoatrophy compromises glycaemic control in patients with T1DM.

We would like to thank Roche Diagnostics Australia, The Mater Foundation, Brisbane for enabling this to occur and also Sanofi-Aventis for continued supply of insulin.

Poster Session II: Pumps and Sensors

P/218/FRI

Continuous subcutaenous insulin infusion for children with type 1 diabetes: an audit of the singleton hospital paediatric

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Aims: This study sought to document the local success of a recent clinical audit of the Continuous Subcutaenous Insulin Infusion (CSII) service at Singleton Hospital.

Methods: 20 of 160 (12.5%) children with type 1 diabetes are currently treated with CSII therapy at Singleton hospital. Of these 20 CSII therapy patients, four use Personal Continuous Glucose Monitoring (CGM) with Carelink® Personal.

Results: CSII therapy improved glycaemic control by ~10%, with HbA1c reducing on average from 9.5 ± 1.1% to 8.6 ± 1.4% ($P < 0.001$). Glycaemic control improved in 89% of patients on CSII therapy. CSII therapy patients that used the CGM function and Carelink® Personal reduced their HbA1c from 9.1 ± 1.0% to 7.3 ± 1.0%. Hypoglycaemic severity reduced in 56% of patients. Admissions to hospital for hypoglycaemia fell from 2 on Multiple Daily Injection therapy to 0 on CSII therapy but this didn't reach statistical significance ($P = 0.08$). The total number of admissions to hospital for hyperglycaemia fell from 11 on MDI therapy to 2 on CSII therapy with a minimum yearly cost saving of £11,691 ($P < 0.05$). Outpatient care visits reduced from a total of 80 in year prior to CSII therapy to 12 in the after CSII therapy was initiated ($P < 0.001$), at a cost saving to the NHS of £5,984.

Conclusion: A significant improvement in glycaemic control has been noted in children with type 1 diabetes treated with CSII therapy. If sustained, the cost savings would offset a considerable proportion of the additional costs required for CSII therapy. An additional benefit was noted when CGM and Carelink® Personal was used.

P/219/FRI

Reducing the time spent outside euglycaemia using the freestyle navigator continuous glucose monitoring system under home use conditions in young adults

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Objectives: This study was designed to investigate the use and impact of the FreeStyle Navigator Continuous Glucose Monitoring System under home use conditions in self-management of type 1 diabetes.

Methods: A 20 day-masked phase, when real-time data and alarms were not available, was compared with an unmasked phase for the next 40 days for a number of specified measures of glycaemic variability by paired t-test. HbA1c (DCA 2000) and a hypoglycaemia fear survey was recorded at the start and end of the study.

Results: A total of 48 patients with type 1 diabetes were included (mean age 35.7 ± 10.9, range 18–61 years; diabetes duration

17.0 ± 9.5 years). Two patients did not complete the study for personal reasons. Comparing masked (all 20 days) and unmasked (last 20 days) phase the time spent outside euglycaemia was reduced from 11.0 to 9.5 hours/day ($P = 0.002$) glucose SD from 63 to 57 mg/dl ($P < 0.001$), hyperglycaemic time (>180 mg/dl) from 10.3 to 8.9 hours/day ($P = 0.0035$), Mean Amplitude of Glycaemic Excursions (MAGE; peak to nadir) by 10% ($P < 0.001$), High Blood Glucose Index by 18% ($P = 0.0014$) and GRADE Score by 12% ($P = 0.0013$). Hypoglycaemic time (<70 mg/dl) decreased from 0.70 to 0.64 hours/day without statistical significance ($P > 0.05$). Mean HbA1c fell from 7.9 ± 1.1% at baseline to 7.1 ± 1.1% ($P < 0.001$). In the Hypoglycaemia Fear Survey the patients tended to take less snacks at nighttime wearing the sensor.

Conclusions: Home use of the FreeStyle Navigator Continuous Glucose Monitoring System has a positive effect on self-management of diabetes. Thus, continuous glucose monitoring may serve as a useful tool to decrease glycaemic variability.

P/220/FRI

CSII with real time continuous glucose monitoring versus traditional CSII: the comparative results

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A new insulin pumps with integrated real time glucose monitoring appeared in clinical practice in recent years. This devices promises the achievement of better metabolic control in diabetic patients.

Objective: To evaluate the results of metabolic control in two group patients, receiving continuous subcutaneous insulin infusion with real time continuous glucose monitoring (CSII RT) and continuous subcutaneous insulin infusion with self monitoring of blood glucose (CSII SMBG).

Materials and methods: A total of 45 patients (21 M/ 24 F) with diabetes type 1 aged 5–22 years (12.1 ± 5.4 years) and duration of disease 3–14 years (7.3 ± 2.9 years) took part in this study. The patients were divided in two groups -CSII RT (n = 22) and CSII SMBG (n = 23), having no difference in age, duration of diabetes and HbA1c levels. The insulin pumps "Minimed 722 Paradigm Real Time" and short-acting insulin analog (Aspart) were used in CSII RT group. The insulin pumps "Minimed 712" and insulin analog (Aspart) were used in CSII SMBG group. Glucose self-control was performed 4–6 times in a day. All patients stayed in hospital for 10–14 days before start of study and visited clinic at least 1 time in 3 month during 1 year for correction of insulin therapy. HbA_{1c} level before and in 3, 6, 12 month after the start of study, the frequency of severe hypoglycemia and diabetic ketoacidosis were analyzed.

Results: HbA_{1c} level before insulin pump was 9.1 ± 1.77% in CSII RT and 9.2 ± 2.0% in CSII SMBG. HbA_{1c} level in 3, 6, 12 was 7.9 ± 1.29%, 7.9 ± 2.3%, 7.8 ± 1.94% in CSII RT group and 8.6 ± 1.8%, 8.9 ± 2.6%, 8.9 ± 1.5% in CSII SMBG group respectively. None of patients suffered from episodes of severe hypoglycemia during the evaluation period. Diabetic ketoacidosis occurred in 2 patients due catheter occlusions in CSII RT group and 2 patient in CSII SMBG.

Conclusion: Insulin pump therapy with real time continuous glucose monitoring significantly improves the metabolic control, in comparison with traditional CSII therapy.

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Type 1 diabetes and recreational scuba diving – one controversial activity where continuous glucose monitoring could improve safety

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Objectives: It is estimated that 100 000 individuals from 10 million (1%) active divers are on insulin treatment. In some countries, type 1 diabetes is a contraindication to diving. Is it possible to identify individuals at risk of having hypoglycaemic events during scuba dive? Is it possible to use CGMS related to scuba dive?

Methods: Twenty-four individuals, 12 T1DM and 12 healthy controls, were studied during 5 recreational scuba dives on 3 consecutive days. Prior to the first dive each individuals' glucose monitor was downloaded with Diasend® (Aidera, Göteborg, Sweden). Plasma glucose measurements were performed in a monitoring schedule related to each dive. CGMS were used during all days and all dives.

Results: One hundred and seventeen dives were performed. The number of hypoglycaemic episodes pre- or post-dive were related to the duration of diabetes, r = 0.83 and $P = 0.01$, the percentage of SMBG values below target (<72 mg/dl) during two weeks prior to dive, r = 0.65 and $P = 0.02$, and total duration below low limit (<70 mg/dl) measured by CGMS. The overall MAD within the group with diabetes was 14.4 ± 6%. Hypoglycaemia pre- and post dive was detected with a positive predictive value of 0.39 and a sensitivity of 0.64. Hypoglycaemia was significantly more common post dive, during evening and night compared to daytime when diving was performed, $P < 0.005$.

Conclusion: The use of downloaded SMBG values together with CGMS during days of diving makes it possible to detect those suitable and not suitable for diving. The CGMS was used with accuracy in such difficult conditions as scuba diving and provided robust information on glucose variations. In the future, real time continuous glucose monitoring could be used before as well as during diving in order to reach the goal of safer diving for those having type 1 diabetes.

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Experience of use insulin pump in treatment of 0–3 years children with DM 1

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Achievement of optimal glycemic control at the smallest patients, treated with basis-boluses insulin therapy, is very difficult. It is connected with frequent (to 8 times a day) feeding of children, need for repeated boluse insulin injections, particular mode of the day, danger of hidden hypoglycemias, etc.

Materials and methods: Within last 2th years, we used for treatment of this children insulin pump "DANA Diabecare IIS" (SOOIL Development Co., South Korea). This pump were applied at 15 children at the age from 1 month till 3th years with the experience of disease from 0 till 2th years. Advantages of this pump is low weight (60 gm) and 0.01 U/hour basal increment that

allowed correct by hours delivery of basal insulin with minimal doses. Efficiency of treatment were estimated each 3 months and based on a glycemic control: fasting glycemia, postprandial and night glycemia, HbA1c level, hypoglycemias rates, including night ones, physical development of children, daily dose of insulin. The CGMS was applied to selection of an optimal dose of insulin in a mode of pump insulin therapy and was very useful in diagnostics of night undetected hypoglycemia and estimations of glycemic index of dairy mixes and food.

Results: Optimal and suboptimal glycemic control has been reached for all children within 2–3 months. Blood glucose levels was within 4.8–10.5 mmol/l. HbA1c was decrease at all patients from 11.3 ± 2.6% to 8.5 ± 1.8%. Rates of light hypoglycemias decreased from 15 episodes to 5 per month, as well as postprandial glycemias (caused by fast absorption of dairy mixes) on 7.3 ± 2.8 mmol/l – as a result of adequate insulin boluse on each food intake. Was lesser frequency of injections (1 per 4–5 days). It was possible to impose the minimum dose of insulin (0.01 U/hour) including unplanned eating.

Conclusions: Pump insulin therapy can be recommended the smallest patients with DM1, as an optimal insulin therapy.

P/223/FRI
Our initial experience with insulin pump treatment

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Objectives: 1. To evaluate the effect of the insulin pump treatment on the glycemic control.

2. To analyze the effectiveness of the used algorithm for the insulin dose adjustment and education.

Methods: A total of 19 Bulgarian diabetic children started insulin pump /Medtronic/ treatment since March 2007. The age ranged 3–17 years, mean age 7.83 + 3.9 years, 9 boys and 10 girls. with duration of the disease between 6 months and 12 years. The algorithm for the adjustment of the insulin dose was the following: The used total insulin dose before starting the pump was decreased by 20%. The starting basal dose was 50% of the calculated daily dose. We have used 4–6 different basal rates corresponding to the physiology of the insulin secretion with the lowest rate 2–4 a.m. and 2–4 p.m. The insulin sensitivity index was calculated using the rule of 80. The carbohydrate/insulin ratio was calculated by the 500 rule. The education was structured in 2 steps including the bolus wizzard.

Results: Most of the patients started on pump did not need significant correction of the initially calculated dose which proved the accuracy of the used algorithm for the dose. The patients with poor control HbA1c ≥10% needed elevation of the insulin dose during the following 3–7 days. HbA1c decreased from 8.8% +1.75 before the start of the pump treatment to 7.17% +1.59 for the last evaluation, proving the effectiveness of the pump treatment.

There were 3 episodes of ketonuria caused by ceasing of the insulin infusion. There were no severe hypoglycemias in neither of the patients. The youngest diabetics below 6 years of age are the most compliant with the pump therapy.

Conclusion: Insulin pump treatment gives the best opportunity for the most physiological adjustment of the insulin dose to the changing individual insulin needs. Proper education and compliance are critical for achievement of all the advantages of the pump.

P/224/FRI
Italian (retrospective) survey on continuous subcutaneous insulin infusion (CSII) in children and adolescents with type 1 diabetes mellitus

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Over the past few decades, continuous subcutaneous insulin infusion (CSII) is increasing popularity. A first national survey (1) showed that more than 3000 adult and paediatric T1DM patients were on CSII in Italy in 2006 and that CSII was still increasing.In 2008 the Italian Society of Paediatric Endocrinology and Diabetology (ISPED) convened a panel of expert physicians for a reasoned translation of the International Recommendations on CSII in pediatric T1DM (2).Some adaptations were necessary in order to take into account certain peculiarities of the diet, timing of meals and life style. Before publishing these guidelines ISPED established to collect retrospective data on the number of pumps used in Italian patients, from 1th Jan 2003 to 31th Dec 2007.

Methods: Data were collected with a questionnaire about all patients, aged 0–18 years, who started CSII therapy during the study period.

Results: Northern Area: data were collected in 263 patients (133M/130F) from 30 Centers; other 7 Centers (23.3%) didn't have patients treated with pump. From 2003 to 2007 patients with CSII increased 4 times (from 22 to 86%).Centre Area: data were collected in 227 patients (116M/111F) from 15 Centers. Other 5 Centers (33%) didn't have patients treated with pump. In the five years of the study CSII increased of 60%.Southern Area: data were collected in 109 patients (45M/64F) from 14 Centers.No patients were treated with pump in 7 Centers (50%). The number of pump prescriptions increased 8 times in 5 years. Islands Area (Sicily and Sardinia): data were collected in 188 patients (96M/92F) from 2 Centers; 3 Centers didn't have patients with pump. In all Italian Areas the most representative age of patients with pump was 11–15 years.

Conclusion: CSII is increasing in Italian paediatric diabetic patients. The adolescent age group (11–15 years) is the most representative, but CSII therapy is used also in pre-school age children.

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P/225/FRI
Sensor-augmented pump therapy in neonatal diabetes

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Management of neonatal diabetes is particularly difficult, due to the small dose of insulin to deliver, irregularities in feeding and risk of hypoglycemia. Insulin pump therapy using diluted insulin (U10) allows the delivery of very low doses of insulin matching with the specific nutritional needs of neonates (frequent meals) and reaches the therapeutic goals of neonatal diabetes: weight catch-up and good metabolic control without hypoglycaemia. However, close blood glucose monitoring with at least 10 glycemic measures a day

is necessary to adjust the basal rate and boluses. We used sensor-augmented pump therapy (Paradigm 522 RealTime®, Medtronic Minimed) (PRT) after initial intravenous management in a 4 months old infant with neonatal diabetes revealed by ketoacidosis. During the first week of PRT, access to glucose measurements in real time facilitated close insulin adaptation to nutritional changes (number and volume of bottles, flour fortification), allowing a rapid and satisfactory catch-up weight (50 g/day). Total insulin daily dose increased from 0.48 at day-2 of pump to 1.22 U/kg/day at day-7 of pump (basal rates: 0.03 U/h on the night, 0.07 U/h on the day; 22% of total daily dose, and 5 boluses per day). Insulin doses adjustments in real time allowed an excellent metabolic control: glucose average of 288 measures/day on PRT at day-2 = 190 ± 52 mg/dl, and at day-7 = 125 ± 30 mg/dl, without any hypoglycaemia (0 measurement < 70 mg/dl). In conclusion, sensor-augmented pump therapy was well tolerated, allowing achievement of a favourable nutritional and metabolic outcome in a case of neonatal diabetes, while avoiding hypoglycaemia and reducing the number of capillary blood glucose measurements to 3 per day.

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Influence of insulin pump-therapy on diabetes complications at child with DM 1 (clinical case)

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Progress heavy chronic complications of children with DM1 is an actual modern problem. It induces to search the ways of their prevention.

Materials and methods: Under supervision there was a 15-year-old girl with DM1. Duration DM1 was 13 years. She had different complications: nonalcoholic steatosis hepatis, hyperlipidaemia (cholesterol: 7.8 mmol/l, triglyceride: 3.2 mmol/l), diabetic nephropathy IV (proteinuria 1.1 g/day), secondary arterial hypertension, general oedema, retinopathy I, diabetic peripheral motor neuropathy, growth failure (-4 SD, growth velocity: 1.5–2 cm/year), delayed puberty (II stage by Tanner), bone age: 10 years. HbA1c was 13.2%. She has 5–6 accident severe diabetic ketoacidosis per year. She got insulin at daily dose 42 IU (1.4 IU/kg).

Results: For the improvement of glycemic controls treatment by an insulin pump (MiniMed Medtronic 508, Medtronic MiniMed, USA) with insulin Aspart was begun. During 2 years a girl grew up on 15 cm (the delay of growth diminished to -2.5 SD), menstrual cycle has been normalized, liver and lipid profile were normalized, neither proteinuria nor microalbuminuria was not exposed, retinopathy was not found. Dynamics of HbA1c every 6 month was 12.2%; 11%; 7%; 17%. Insulin daily dose went down to 22 IU (0.6 IU/kg/day). During 2 years there were no DKA accident.

Conclusions: Use of insulin pump therapy at child leads to prevention of the acute complications and regression of chronicle diabetes complications, even at vibrations of HbA1c.

Poster Session I: Pumps and Sensors

P/227/WED

Discontinuation of insulin pump treatment in children, adolescents and young adults. a multi-center analysis based on the DPV database in Germany and Austria

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Objectives: Insulin pump therapy is well established in the treatment of children and adolescents with type 1 diabetes. Most studies focus on outcome parameters like HbA1c, hypoglycemia and quality of life, whereas few reports address patients who discontinue pump therapy. This survey focuses on the discontinuation rate of insulin pump treatment in the pediatric and young adult age group.

Methods: The prospective multi-center DPV (electronic diabetes patient documentation system) database has been established since 1990 and is broadly used in Germany and Austria. All pump users among the participating centers documented since 1995 were included in this analysis.

Results: A total of 11 710 patients with type 1 diabetes were recorded as treated with insulin pumps. In total 463 patients (4%) switched from insulin pump treatment to multiple daily injections (MDI). In the group of patients who stopped with pump treatment, the mean duration of pump therapy was 1.7 years (SE ± 0.06 years), 60.5% were female. Subdivided into age groups, the discontinuation rate was lowest in the age group < 5 years (0.1%), followed by the groups aged 5–10 years (0.3%), 15–20 years (0.8%) and > 20 years (0.8%). The group aged 10–15 years showed the highest rate of discontinuation (2%).

Conclusions: The discontinuation rate of insulin pump therapy is in general low (4%). The younger the patients at the time of initiating insulin pump treatment, the lower is the discontinuation rate. The highest rate was seen in adolescents aged 10–15 years. Girls stopped insulin pump treatment more often than boys (60.5% vs. 39.5%).

P/228/WED

The diasend system as continuous educational tool in the management of type 1 diabetic children treated with continuous subcutaneous insulin infusion

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Several studies reported a mean HbA1c reduction of 0.5–1% after one year of CSII treatment in children with type 1 diabetes (T1DM). Recently new methods of teleassistance developed, but only little data on paediatric age is available.

The aim of the study was to compare a conventional method versus a teleassistance approach in the follow-up of children with T1DM treated with CSII.

Research design: Forty-five diabetic children (mean age: 11.6 ± 3 years) started CSII during 2008 and were randomly assigned to a conventional follow-up arm (22 patients;

11.9 ± 3.3 years) or to a telemedicine arm (23 patients; 11.1 ± 3.2 years) with daily/weekly download of glycaemic values and pump settings. Patients from the telemedicine group used the Diasend device; it is a system that allows diabetic staff to store and monitor patients' glucose readings and insulin pump doses with a complete overview of the transmitted information, 24 hours a day. At 3 months interval HbA1c levels were evaluated as indicator of efficacy.

Results: No differences in terms of glycometabolic control have been reported between the groups (mean HbA1c decrease at 6 months 0.3% and 0.35% respectively in conventional vs. Diasend group). In particular, the HbA1c values at 0, +3 and +6 months were similar in the two arms of treatment (7.9, 7.6 and 7.6% vs. 7.9, 7.62 and 7.55%, respectively in the conventional and telemedicine group). Instead, compared to conventional group, patients using Diasend demonstrated a significantly shorter time to reach correct basal infusion (41 vs. 60 days), insulin to CHO ratio (51 vs. 62 days) and insulin sensibility factor (29 vs. 37 days). These data demonstrated the efficacy, in terms of glycometabolic control and quality of care, of an integrated system of continuous insulin infusion and teleassistance. Continuous tele-education is useful in order to rapidly obtain a stable basal profile and insulin to charbo ratio and probably a long term better glycometabolic control.

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Reducing glycaemic variability and Hba1c with the Dexcom Seven.2® continuous glucose monitoring system in children and young adults with type 1 diabetes (T1D)

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Objectives: To investigate the use and impact of the DexCom Seven.2® continuous glucose monitoring system (CGMS) under home use conditions in self-management of diabetes.

Methods: The study was for 63 days of continuous sensor wear in 56 patients (50% male, mean age 14.0 ± 4.7 years, diabetes duration 5.5 ± 3.5 years) with T1D at home. 40 patients (71.4%) were on CSII, the remaining on MDI. Real-time data, trend arrows and threshold alarms were not available for the first 21 days (masked phase A) but for the following 42 days (unmasked phase B). In the unmasked phase, subjects were instructed to make treatment decisions based on CGM-data except during hypoglycaemia or rapidly changing glucose values when confirmatory capillary BG test was performed prior to self-management decisions. The primary endpoint was to evaluate improvement in glycaemic variability between both phases of the study and therefore both were compared for a number of specified measures of glycaemic variability by paired t-test. HbA1c was recorded by DCA 2000 at start and end of the study.

Results: All but one patient completed the study. HbA1c decreased significantly from 7.9 ± 1.5% at baseline to 7.5 ± 1.0% at the end of the study ($P < 0.001$), with 39 patients (70.1%) showing an improvement of HbA1c. At present CGMS-data of 9 patients were analyzed. Comparing phase A and B, these 9 patients had an increase of time spent inside the target zone (70–180 mg/dl) from 53.9% to 64.4%. There were reductions in mean glucose from 181.1 mg/dl to 159.8 mg/dl, as well as in glucose SD from 67.9 to 60.7 mg/dl. No relevant adverse events occurred; no serious adverse events were reported.

Conclusions: These data clearly indicate that the use of the DexCom Seven.2® CGMS in children and young adults with T1D has a beneficial effect on self-management of diabetes concerning glycaemic control and glycaemic variability.

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The optimal type of bolus following a "Mediterranean" meal in children and adolescents with type 1 diabetes (T1DM) using insulin pump therapy (CSII)

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Objectives: Last year we observed that the best bolus for a pizza margherita meal is 30/70 dual wave bolus (DWB) extended over 6 hours. Because of this, we start to consider that for a ''Mediterranean'' meal (MM) a DWB might be better than a simple bolus (SB). We compare a SB with different kind of DWB in order to identify the optimal one in case of a MM.

Methods: We evaluated 26 children, aged 5–23 years (mean 15.4 ± 4.8 years) with T1DM from 9.7 ± 4.9 years, BMI 22.0 ± 4.4 kg/m^2, with CSII (insulin requirement 0.76 ± 0.14 U/kg/day). Each patient utilized the following 6 aspart regimens on 3 consecutive days, and glucose values were recorded with SMBG: a) a SB (100% of insulin (I) given immediately) injected 15 min before meal; b) a SB (100% of I given immediately) injected just before meal; c) 4-hour DWB (50% of I given immediately and 50% given over a 4-hour period) injected 15 min prior meal; d) 4-hour DWB (50% of I give immediately and 50% given over a 4-hour period) injected just before meal; e) 4-hour DWB (70% given immediately and 30% given over a 4-hour period) injected 15 min before meal; and f) 4-hour DWB (70% given immediately and 30% given over a 4-hour period) injected just before meal. Total CHO was kept constant for each meal; I dose was calculated according to glycaemic value and CHO, using ISF and INS : CHO ratio, personalized for each patient.

Results:

Conclusion: 70/30 DWB extended over 4-hour period following a MM injected 15 minutes before provided significantly less postprandial hyperglycemia during the 4-hour period. SB could be used only if given 15 minutes before meal, even if we observed a rise in glycaemic values in the last 2 hours of the study.

P/231/WED

Increase dose of insulin controls postprandial glycemia for products with a high glycemic load in children with type 1 diabetes

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Background: Scientific data show that 60% of patients with diabetes don't achieve a target level of HbA1c. One of the determent factor is postprandial hyperglycemia and difficulties on adjusting insulin dose for meals with high glycemic index and load.

Aim: To assessment potential effects of using the raised insulin-carbohydrate ratio (ICR) for products with a high glycemic load in children and young people with type 1 diabetes.

Materials and methods: Study with randomisation using open label method with stratyfication of a group according to the age. A total of 70 children and adolescents, aged from 4 to 18 years out of remission phase treated with CSII received increased 30%-grA, or normal ICR-grB dose of insulin for a cornflakes with milk for

Table for P/230/WED [Glycaemia according the different bolus types.]

	T'0	T'30	T'60	T'90	T'120	T'180	T'240	T'300	T'360
SB 15 minutes before	157 ± 83	145 ± 67	139 ± 60	139 ± 70	133 ± 50	122 ± 67	138 ± 59	161 ± 60	148 ± 62
SB immediately before	143 ± 77	144 ± 71	136 ± 82	119 ± 75	122 ± 70	144 ± 51	156 ± 65	180 ± 65	193 ± 80
								$P = 0.02$	$P = 0.01$
DWB 50/50 in 4-hour 15 minutes before	114 ± 64	163 ± 52	181 ± 63	172 ± 72	163 ± 75	131 ± 68	121 ± 70	105 ± 44	98 ± 26
		$P = 0.03$	$P = 0.02$	$P = 0.03$	$P = 0.03$				
DWB 50/50 in 4-hour immediately before	125 ± 45	140 ± 55	149 ± 73	147 ± 58	144 ± 63	139 ± 69	124 ± 77	144 ± 104	152 ± 111
DWB 70/30 in 4-hour 15 minutes before	113 ± 52	146 ± 57	144 ± 47	121 ± 46	137 ± 66	123 ± 55	122 ± 58	113 ± 63	105 ± 43
DWB 70/30 in 4-hour immediately before	109 ± 37	114 ± 42	114 ± 50	114 ± 54	116 ± 41	127 ± 66	152 ± 60	181 ± 72	189 ± 76
							$P = 0.02$	$P = 0.01$	$P = 0.01$

breakfast. During following 2 hours glucose level was measured from capillary in 0', 15', 30', 45', 60', 90', 120'.

Result: The experimental group (A) and control group (B) were similar with regard to duration of diabetes- grA:6,15 years, grB:5,09 years $P = 0.164$; SDS BMI-grA:0.79 IU/kg/d, grB:0.69 IU/kg/d $P = 0.0569$; and basal insulin-grA:37.26% of TDD, grB:39.73% of TDD $P = 0.4572$. Significantly elevated glycemia was noted in control group in 45 and 60 minutes after breakfast. Distinction (Δ) between glucose level in 0' and 40' come to 180.19 mg/dl in grB vs. 69.5 mg/dl in grA $P < 0.001$ and in 0'–60' come to 187.8 mg/dl in grB and 69.65 mg/dl in grA $P < 0.001$. The hypoglycemia episodes has occurred occasionally in both group- 7 (11%) in grA, and 5 (8%) in grB $P = 0.75$-during 120 minutes observation.

Conclusion: Raised insulin–carbohydrate ratio (ICR) for products with a high glycemic load allows to reach recommended postprandial glycemia level in children with type 1 diabetes without elevated risk for hypoglycemia.

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The RealTrend Study: Effect of continuous glucose monitoring on metabolic control in addition to pump therapy in poorly controlled type 1 diabetic patients

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Background and aims: Efficacy of insulin pump augmented with continuous glucose monitoring (CGM) versus Continuous Subcutaneous Insulin Infusion with standard self-monitoring of blood glucose has not yet been determined.

Materials and methods: In this randomized, controlled, multi-center trial, 132 adults and children with type 1 diabetes, insufficiently treated with multiple daily insulin injections (A1c ≥ 8%) were assigned to a 6 months treatment in one of 2 study arms: PRT arm, fitted with the Paradigm REAL Time System (Medtronic insulin pump with integrated CGM), or CSII arm, fitted with an insulin pump and conventional blood glucose self-monitoring.

Results: HbA1c was analyzable for 115 patients (46 children, 69 adults) of the full analysis population (FAS) and improved between baseline and study end in the two groups (PRT, n = 55, −0.81% ± 1.09; CSII, n = 60, -0.57% ± 0.94; $P = 0.087$). A per protocol (PP) analysis of 91 patients (35 children, 56 adults) who wore sensors over 70% of the time (as required by the inclusion criteria) showed a significant difference in A1c reduction between groups (PRT; n = 32; -0.96% ± 0.93, CSII, n = 59; −0.55% ± 0.93, $P = 0.004$). Ancillary analyses revealed a significant decrease in HbA1c levels between the screening visit and the end of the study (PRT -1.14 ± 1.21, $P < 0.001$; CSII group -0.57 ± 0.91, $P < 0.001$), as well as a significant difference in favor of the PRT group ($P = 0.006$) for the entire study population as well for the per protocol population (PRT -1.23 ± 1.08, $P < 0.001$; CSII -0.55 ± 0.90, $P < 0.001$; inter-group comparison: $P < 0.001$). In PRT group, CGM hyperglycaemia parameters decreased in line with HbA1c, without increased hypoglycaemia.

Conclusion: In both FAS and PP populations HbA1c decreased in both study arms after treatment was changed from MDI to CSII or PRT, but improved significantly more in the PRT group when patients wore the CGM more than 70% of the time versus CSII.

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Children on insulin pump treatment need specialized follow-up to achieve sustainable long-term good metabolic control – distressing results from 2 years follow-up data on CSII treatment

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Objectives: The use of continous subcutanous insulin infusion (CSII) in children with T1DM is increasing. Cross-sectional results from the Swedish national diabetes quality registry (Swediabkids-NDR) show no difference in HbA1c between CSII and MDI (multiple daily injection) treated patients, in spite of a more physiological insulin delivery with CSII. There is a lack of long-term follow-up results for CSII. The aim of the present study was to retrospectively assess long-term metabolic control after start of CSII treatment in different age groups, compared with sex, age and HbA1c-matched MDI treated controls.

Methods: A total of 90 children (age 1.8–19, 50% girls) who started CSII between November 2004 and November 2006 were devided into age groups: ≤8.9 (n = 22), 9–10.9 (n = 14), 11–12.9 (n = 25) and ≥13 (n = 29) years. HbA1c analyzed 12 and

6 months before, at start and 6, 12 and 24 months after initiation of CSII were collected.
Results: After 6 months of CSII mean HbA1c had decreased 0.3%, 0.3%, 0.7% and 0.4% in the different age groups (mean decrease 0.5%, $P = 0.004$). Between 6 and 24 months CSII treatment HbA1c increased with 0.1%, 1.0%, 0.8%, and 0.5% respectively (mean increase 0.5%, $P = 0.003$). When analyzing the different age groups children older than 9 years at CSII initiation increased HbA1c significantly after the first 6 months of better metabolic control (mean increase 0,7%, $P = 0.003$). Comparison with controls and national Swedish results in different age groups are presently performed.
Conclusions: CSII treatment results in significantly lower short-term HbA1c. However, only in young children, starting CSII before the age of 9, the improved metabolic control for the following 2 years is sustained. Specialized follow-up programs are needed to achive sustainable good metabolic control when older children start CSII. We propose a program with more active parental continued support and involvement.

P/234/WED
Continuous Glucose Monitoring System (CGMS): clinical interest and acceptability in children with type 1 diabetes mellitus

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Aims: We studied the interest of Guardian RT system as a "tool for patient" (which can bring the patient information to be used by himself) and as a "tool for physician", its acceptability, and its impact on metabolic control.
Methods: A total of 61 paediatric patients, diagnosed with type 1 diabetes for more than one year, used the device for 12 consecutive days. 12 patients agreed for a second period 3 months later. Acceptability and interest in therapeutic education were evaluated by a questionnaire, based on the CGMS-SAT questionnaire, at the end of the recording period. We checked for HbA1c level and hypoglycaemias frequency after 6 months.
Results: CGMS is seen as helpfull by our patients (doses adjustment, fear about hypoglycaemia). But they did not consider that device as a way to improved their diabetes care. Acceptability of that device is poor (feeling of less freedom, uncomfortable...). Fifty-four percent of them did not want to use it again in its current form, but 91% of them would agree in the future if improved. CGMS also helped the physician (to improve insulin dosing, to bring out unidentified situations such as night nibbling or dawn phenomenon). HbA1c didn't decrease 6 months after the recording period (7.9% vs. 7.77%), but hypoglycaemias frequency decreased (10.9 hypoglycaemias for 100 blood glucose tests vs. 16). Patients with initial HbA1c over 8% improved their HbA1c (8.00% vs. 8.78%, $P < 0.05$), such as children with two recording periods (7.68% vs. 8.17%, $P < 0.05$).
Conclusion: Impact on metabolic control is higher in initially poor controlled patients and with more intensive use of the CGMS. CGMS is seen as usefull both for the patients and the physician, and could be able to bring them help to improve metabolic control. Our study shows that although patients expressed a real interest about the principle of this device, it would deserve some improvements to make it more acceptable for patients.

Poster Session II: Type 2 Diabetes in Children

P/235/FRI
Obesity prevention at preschool age "Fit von klein auf - Health Tool Kit": results of a randomized intervention study in 827 children

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Background: The effects of the primary prevention program of obesity, Gesunde Kindergärten in Niedersachsen - Fit von klein auf" were investigated in a sample of 33 kindergartens all over the Federal State of Lower Saxony in Germany.
Methods: Eligible institutions were randomized to an intervention and a control group with a cross-over after one year. The intervention contained a health tool kit focussing on physical exercise combined with professional support by a nutritionist and psychologist during parent groups. Outcome parameters included height, weight, motor performance (MOT 4-6), health related quality of life (Kiddy-Kindl 4–7 years) as well as socio-demographic data.
Results: The study included 827 children (426 intervention group vs. 401 control group) with a mean age of 4.6 ± 0.4 years, 51.6% male. Ethnic minorities were sufficient represented (14.5% had non-German parents). At baseline the mean BMI-SDS was 0.08 ± 1.02, (7.2% overweight; 4.4% obese). After 12 months the BMI-SDS of the intervention group declined 0.04 SDS, whereas the BMI-SDS of the control group increased 0.11 ($P < 0.001$). 12 months after intervention the BMI-SDS of the intervention group continued to decline by 0.03 SDS. The effect of the intervention was stronger in those intervened earlier. At the end of the study 44% of the obese or overweight group had reached normal weight. Motor performance gains of the intervention group were higher than those of the control group (3.93 vs. 2.56 points, $P < 0.001$) increasing further by 2.49 points 12 months after intervention. Again the effect of the intervention was stronger in those intervened earlier. No effect of the intervention was seen on the health related quality.
Conclusion: This study provides evidence that an intervention for obesity prevention is feasible at preschool age. It leads to sustained beneficial effects regarding BMI and motor performance. Thus, obesity and diabetes prevention can be started before entering primary school.

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Baseline and the 2nd year-survey characteristics of child- and adolescent-onset type 2 diabetes: a longitudinal nationwide survey on the development of diabetic complications in Japan

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Wide scanning of the long-term diabetic complications of such patients has demonstrated that 12% developed severe diabetic vascular complications in their thirties in one diabetes-specific hospital. Therefore, a longitudinal nationwide survey of the development of diabetic complications was started from 2007. 688 after the second year survey was subjects in this study: 501 by 274 Internists /187 by 34 Pediatricians and male/female of groups under 19 (U) and over 20 (O) age at registry were 179/170 and 153/186, respectively. First of all, % of female patients whose mother had type 2 diabetes was significantly larger than that of the male whose mother had ($P < 0.03$). The detection rates by urine glucose screening in the school of U and O groups were 60%/75% (m/f) and 45%/75% (m/f), and the max BMI values in U and O groups were 30/29 (m/f) and 31/29 (m/f), respectively. The waist circumferences (cm) in U and O groups were 96/89 (m/f) and 96/84 (m/f), respectively. HOMA-IR index was related to BMI. Such obese patients with type 2 diabetes were also hypertensive and dyslipidemic. Among patients without insulin treatment, fasting IRI in O group was significantly lower than in U group both in male and female. Photocoagulation therapy was performed in 35 patients and clinical nephropathy was observed in 17 patients. One patient had one toe amputation already. There was a deterioration of retinopathy in 19 and nephropathy in 48 patients. In conclusion, children and adolescent with type 2 diabetes were obese with a tendency of hypertension and dyslipidemia regardless of gender, suggesting that metabolic syndrome might be excited at the upper stream before the development of diabetes. Although some of them had microvasular complications, nobody had cardio-vascular diseases. Microvascular complications may precede macrovascular complications in Japanese patients with type 2 diabetes.

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Inflexion of the glucose disposition vector among insulin resistant children may be a sign of early beta cell insufficiency

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Aim: Blood glucose is controlled by the interaction between insulin sensitivity (S) and insulin secretion (B), whose vector can be plotted over time. We tracked the vector of children who were insulin sensitive, and compared it with that of children who were insulin resistant.

Methods: BMI (kg/m^2), HOMA-%S and HOMA-%B were recorded annually from 5 to 12 years in 258 healthy children (144 boys) from the EarlyBird cohort, grouped according to quartile of insulin sensitivity at 5-years (lowest Q1, highest Q4).

Results: BMI SDS ($+0.16\ Kg/m^2$, $P < 0.01$) and glucose ($+0.6$ mmol/l, $P < 0.001$) rose progressively from 5 to 12 years. BMI of Q4 was lower than Q1 ($P < 0.02$), HOMA-%S (predictably) higher ($P < 0.02$), and HOMA-%B lower ($P < 0.03$) throughout. The vector of Q4 shifted only slightly in response to the loss of S associated with puberty. The vector of Q1, on the other hand, traced an early loss of B followed by an acute switch in direction at 7-year with subsequent fall in S.

Conclusions: The inflexion appears to be a feature of early insulin resistance, and may correspond to a weakening of glucose control associated with adjustment to beta cell loss. Importantly, it does not appear to be a normal event, and could represent early beta cell pathology in contemporary children.

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Associations of weight at birth, weight at diagnosis, and family history of diabetes in children with T2DM in the Tokyo metropolitan area

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Several studies in adults have shown the prevalence of type 2 diabetes mellitus (T2DM) to be inversely associated with birth weight. On the other hand, some recent studies in childhood T2DM demonstrated a U-shaped relationship between birth weight and the risk of developing T2DM. We studied the associations of weight at birth, weight at diagnosis, and family history of diabetes in children with T2DM in the Tokyo Metropolitan Area. 103 Japanese children, 41 males and 62 females aged 12.7 ± 1.7 years at diagnosis, with T2DM were analyzed in the birth weights, weight at diagnosis, age at diagnosis and family history of T2DM. They were diagnosed as having T2DM through the urine glucose screening program in the Tokyo Metropolitan Area. 75.3% of patients with T2DM were obese at diagnosis. 67.9% had a family history of T2DM in second- and first-degree relatives. The mean weight at birth was 3278.0 ± 609.6g. 7.9% of the patients had low birth weights (<2500 g) and 10.9% had high birth weight (>4000 g). There is no significant correlation between the mean age at diagnosis of T2DM and birth weights. The frequency of high birth weight in children with T2DM was significantly higher than that in control group ($P < 0.0001$), however, there is no significant difference of the frequency of low birth weight between children with T2DM and control group ($P = 0.5389$). There was no significant correlation between the birth weight and weight at diagnosis of T2DM. Patients with family history of T2DM have higher birth weights than those without family history of diabetes, but not significant (3316.8 ± 651.6 vs. 3188.9 ± 494.8, $P = 0.3268$). There was no significant difference of the frequency of family history of T2DM among birth weights in the patients. High birth weights may cause insulin resistance more severe than low and normal birth weights, which could be the risk factor for future T2DM. Family history of T2DM could be associated with developing T2DM, but does not affect the birth weight in children with T2DM.

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The first report on the prevalence of impaired fasting glucose and type 2 diabetes in a population-based sample of overweight/obese children in the middle east

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Background: Type 2 diabetes mellitus (DM2) is increasing in young population because of high prevalence of obesity in this age group. Obese children with impaired fasting glucose (IFG) are at increased risk for developing diabetes. The aim of this study was to determine the prevalence of IFG and DM2 for the first time in a representative sample of Iranian children and adolescents with obesity.

Methods: A total number of 672 overweight and obese Iranian children, aged 6–19 years (mean, 12.89 ± 3.10 years) selected from 7554 students, were included in this cross-sectional, population-based study. Fasting plasma glucose (FPG) and lipid profile were measured in all participants. Oral glucose tolerance

test and insulin level were measured in those children with IFG (100≤ FPG <126 mg/dl). Insulin resistance defined by HOMA-IR more than3.10.
Results: The prevalence of IFG and DM2 were 4.61% (31 persons; mean age, 13.23 ± 3.58 years) and 0.14% (1 person; age, 18.00 years), respectively. There was no significant difference in lipid profile between IFG group and other children. Impaired glucose tolerance and insulin resistance were detected in 3 and 6 participants with IFG, who consisted 0.4%and 0.8% of total obese and overweight students, respectively.
Conclusion: Although the prevalence of DM2 is low in Iranian obese children and adolescents, IFG is not uncommon. Preventive measures notably lifestyle modification and regular screening of FPG should be considered to these children.

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Type 2 diabetes mellitus and impaired glucose tolerance in obese children

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Aim: Monitoring of the obese patients, aiming for the detection of type 2 DM in early stages in the youth.
Material and method: Within 2006–2009, we studied 45 children and adolescents with primary obesity in whom other causes of obesity were excluded (genetic, endocrine, central nervous, chromosomial). In the studied group we monitored: positive familial hystory for DM, suggestive clinical elements for insulin-resistance (obesity, acanthosis nigricans) and biologically we assesed the OGTT every six months.
Results and discussions: We found positive family history of type 1 and/or type 2 DM in 12 cases. Depending on the weight excess at the moment of first visit: 15 cases presented mild obesity, 18 cases medium obesity while 12 cases were severely obese. Neither one presented clinical symptoms of diabetes mellitus. At the first visit fasting blood glucose was normal in all cases. Considering the results at the OGTT, 12 cases were diagnosed as having impaired glucose tolerance. HbA1c level was normal. In all cases we recommended hypocaloric diet with low carbohydrates amount, divided into 6 meals /day. After 3 years of following-up, 3 cases (2 girls and 1 boy) of pubertal age, were diagnosed as having type 2 DM, considering their high blood glucose levels (above 250 mg%) at 2 hours after the glucose loading, within the OGTT. The metabolic desequilibrium was confirmed by the increased level of HbA1c in all 3 cases. All 3 children had positive family hystory for DM. Anti GAD 65 and ICA were negative in these 3 children. In the 3 cases we initiated therapy with Metformin 2 × 500 mg/day. 3 months after starting the therapy, HbA1c levels decreased (HbA1c < 6% - 2 cases, HbA1c = 6.5% in the 3rd case).
Conclusions: 1. Obesity in the child represents a factor of insulin resistance that may favour the occurence of type 2 DM. 2. The onset of type 2 DM at puberty confirms the ideea that puberty represents a precipitating factor for the occurence of type 2 DM.

P/241/FRI
Experience of the using analog insulin at neonatal diabetes

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Introduction: Permanent neonatal diabetes mellitus (PNDM) will concern to group of rare diseases. Starting preparation of treatment is application of traditional insulins (Actrapid and NPH). Application of analog insulins is debatable.
Purpose: It was research aim to reveal efficiency of replacement of traditional insulins on analog (ultrashort and long acting) in pediatric practice at PNDM at children of breast-feeding age.
Methods: Patient from PNDM, diagnosis is revealed in 1 month. Child from 3 pregnancies, 2 sorts, birthweight 1330 g, growth-47 cm. at mother gestational diabetes (daily doze of insulin 24 units/day). Child has plural malformations: anemia of 2 degrees, hypochromic, mixed genesis; inguinal hernia; malabsorption syndrome; congenital anomaly of urinary tracts; delay of rates of general development.
Results: Treatment was begun with Actrapid and NPH since by establishments of diagnosis. Starting doze of insulin of Actrapid makes 0.6 units/day, NPH – 1.3 units/day. Level HbA1c in condition treatment makes 12.1%. Daily glycemium from 23.1 to 15.4 mmol/l. Glucosuria make + +. Hormonal inspections: TSH-6.3 mE/L (norm 0, 3–4, 1), IGF-1 – 19.3 ng/ml (norm 49–171), C-peptide – 31.1 pmol/l (norm 110–1110). In age 1 year child is transferred on analog insulins (Lispro and Lantus). Daily doze of Lispro 4–4.5 units/day and Lantus 1, 5 units/day. HbA1c makes 8.6% through 3 months. Daily glycemium from 8.1 to 10.4 mmol/l.
Conclusions: Application of analog insulins (ultrashort and long acting) it lets to reach target levels of daily glycemium and parameters of long-term metabolic control at sick from PNDM.

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Type 1, type 2 and double diabetes in Caucasian children and adolescents

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The aim of this study was to evaluate a relationship between insulin secretion and insulin sensitivity in children with new onset of diabetes mellitus (DM) to determine the type of diabetes.
Methods: A total of 72 patients with new onset of DM aged from 7.7 to 17.9 years were included into the study. Insulin secretion was estimated on the base of the serum C-peptide concentration. Euglycemic–hyperinsulinemic clamp was performed to estimate insulin sensitivity - glucose disposal rate (M value). ICA were measured by indirect immunofluorescence and anti-GAD autoantibodies - by ELISA.
Results: C-peptide levels ranged from 0.03 to 1.50 pmol/l. C-peptide level was above normal range in 2 patients, in normal range - in 19 individuals, and below normal range - in 51. Correlations between C-peptide and: patients age (r = 0.33; $P = 0.005$) and BMI-SDS (r = 0.45; $P < 0.001$) were found. M values were between 1.5 to 14.0 mg/kg/min. In 26 individuals (36.1%) insulin resistance was recognized (M value £ 5.5 mg/kg/min.). The negative correlation was found between M value and patients age (r = -0.54, $P < 0.001$) and BMI-SDS (r = -0.56, $P < 0.001$). Hyperbolic relationship was found between insulin secretion and isulin sensitivity (R = 0.7, $P < 0.001$). 37 patients (51.4%) were positive for ICA and 55 (76.4%) - for anti-GAD antibodies. In 2 patients type 2 diabetes was diagnosed (insulin secretion > normal range + insulin resistance + no autoantibodies), in 46-type 1 diabetes (insulin secretion < normal range + normal insulin sensitivity ± autoantibodies), and in 24-double diabetes (insulin secretion below or in normal range + insulin resistance ± autoantibodies).
Conclusion: In Caucasian children and adolescents type 2 DM is rare, but in many patients with initially diagnosed type 1 DM insulin resistance is present. In patients with coexistence of insulin

secretion disturbances and insulin resistance ''double type'' DM should be recognized.

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Distinctive features of a combination of components of a metabolic syndrome at children and teenagers with type 2 diabetes

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8–45% of patients with diabetes at children's age have not immune forms of disease.

Aim: We aimed to examine combination of type 2 diabetes (Dt2) with separate components of a metabolic syndrome (MS) in children's.

Materials and methods: This cross-sectional study involved 84 children with Dt2 (m/f = 38/46, middle age 15.28 ± 1.38 years). All patients were conducted to biochemical blood analysis, lipidogram, glucose levels and insulin before and after glucose loading.

Results: Separate components of MS are found out in patients with Dt2: an arterial hypertension (AH) - at 53 from 84 patients, abdominal adiposity (AA) - at 76, hyperlipidemia (HL) - at 49, hyperuricemia - at 2. Isolated Dt2 - in 12 (1st group); combination Dt2 with AA, AH and HL - in 42 patients (2nd group). Blood pressure systolic was (135 ± 4.8) higher in 2nd group then in 4th group where AH was not combined with AA and HL ($P < 0.05$). In 3 group the total cholesterol (TH) (4.98 ± 1.96 mmol/l) was higher than in group with Dt2 + AO (5th group) ($P < 0.05$). Triglycerides level (1.88 ± 0.95 mmol/l) was higher in 2nd group with MS (Dt2 + AA + AH + HL), than in 6th group (Dt2 + AA + HL) ($P < 0.05$). Level of cholesterol high density more low in 5th group than in 4th (28 ± 2.9 mmol/l) ($P < 0.02$). Pure insulin higher in 2nd group (34 ± 3.2 U/l) unlike 1, 3, 4, 5, 6th groups ($P < 0.01$, $P < 0.01$, $P < 0.01$, $P < 0.01$, $P < 0.05$ accordingly). Glucose/insulin before and 2 hours after loading were significantly below 6th group (7.5 ± 1.9 and 4.9 ± 1.3) then in 3rd group (18.96 ± 3.8 and 10.53 ± 2.1) ($P < 0.01$ and $P < 0.05$ accordingly). Mean blood pressure systolic (132 ± 4.6), the blood pressure diastolic (88.5 ± 7.8), BMI (32.3 ± 1.1 kg/m^2), TH (4.76 ± 1.76 mmol/l) significantly higher in combination of Dt2 + AA + AH ($P < 0.05$).

Conclusions: Dt2 is most often combined with AA + AH + HL in children and teenagers. Combination of two or three components of MS deviates mostly (abdominal fat distributions, lipidograms), than in Dt2 group with one of these factors.

