

EPIDEMIOLOGY OF TYPE 1 DIABETES MELLITUS IN ROMANIAN CHILDREN BETWEEN 1995 AND 2001

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Background. In the last years, the incidence of type 1 diabetes in children is on the rise worldwide, especially in some age groups.

The aim of the study was to update the epidemiology of type 1 diabetes in Romania with data from 2001.

Subjects and method. As in the past years, the ONROCAD Study Group requested the Districtal Diabetes Centers to nominally report all new cases of type 1 diabetes in the age group 0-14 years. The data were processed regarding the general incidence, the incidence based on age groups, gender, districts, ethnic groups. Subsequently, we compared the results with those obtained in the previous years.

Results. During 2001, 230 new cases of type 1 diabetes in children (0-14 years) were reported, leading to a general incidence of 5.66/100,000; exceeding the one in 2000 (5.05/100,000) and in all the previous years (table). Furthermore, we observed an increase in incidence both in the age group 5-9, and in 10-14 years. When the district-specific incidence was computed, we had the surprise to notice the important increase in the incidence in Bucharest, since 1998: 6.25/100,000 in 1998; 8.16/100,000 in 1999; 9.66/100,000 in 2000, and 12.26/100,000 in 2001.

Year	General incidence	Age-specific incidence (1995 – 2001)		Ethnic-specific incidence (1998 – 2001)	
1995	3.51	0 - 4	1.46 – 2.84	Romanians	3.90 – 5.53
1996	3.91				
1997	4.08				
1998	4.10	5 – 9	3.37 – 5.50	Hungarians	7.02 – 8.98
1999	4.97				
2000	5.05	10 – 14	4.37 – 7.89		
2001	5.66				

If we refer to the data published by the EURODIAB Study, where the incidence was lower than 4-5/100,000, this phenomenon is hard to explain. Other districts with a high incidence are: Covasna, Cluj, Sibiu etc. Considering the ethnic groups, the incidence of type 1 diabetes in the Romanian population, although up-going, remains significantly lower than in the Hungarian group (7.19/100,000). We have also noted that boys were predominantly affected in the past 2 years, and that resulted in the reversal of the gender-specific incidence.

Conclusion. The general incidence of type 1 diabetes in Romania has an ascending trend, especially in the Romanian population, in male gender and in the older children (5-9 10-14 years)

GAD AND ISLET CELL ANTIBODIES IN ROMANIAN CHILDREN AND ADOLESCENTS WITH DIABETES

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Background. Childhood type 1 diabetes is defined by autoimmunity and insulinopenia. Etiopathogenic definition based on biochemical characteristics has recently replaced the clinical definition based on insulin requirement for treatment. However, large studies based on the new definition are scarce.

Aims. The purpose of this study was to describe biochemical and clinical characteristics of children with clinically diagnosed type 1 diabetes hospitalized at the "Cristian Șerban" Center in Buzias.

Patients and methods. Fasting C peptide, HbA_{1c}, islet cell autoantibodies (ICA) and antibodies to glutamic acid decarboxylase (GADA) were measured in 278 youths aged (median; 5th– 95th percentile) 15 (8-23) years with disease duration of 2.1 (1.1-3.1) years. GADA and ICA positivity was defined by values higher than the 95th percentile in 99 age-matched non-diabetic controls (1.4 for GADA, 0.4 for ICA).

Results. As many as 66.2% of all patients had positive GADA and 10.1% had positive ICA, reflecting the drop in ICA positivity with diabetes diagnosis. While 68.7% had at least one positive Ab, only 7.6% had both Ab's positive. While, as expected, most of the children (79.9%) had fasting C peptide values in the low range (<0.5 ng/ml), 3 patients (1.1%) had biochemical signs of insulin resistance (C peptide concentrations >3 ng/ml). 2 of the 3 insulin resistant children had positive GADA and one of them had positive ICA, therefore showing "mixed" features of both type 1 (autoimmunity) and type 2 diabetes (insulin resistance). All 3 insulin resistant diabetic children were female. They also had other features of the insulin resistance syndrome, i.e. significantly higher insulin requirement, total cholesterol and triglyceride concentrations: 1.1 vs. 0.8 units/kg/day, p=0.05; 162.7 vs. 150 mg/dl, p=0.01; and 129.4 vs. 83 mg/dl, p<0.001, respectively.

Conclusions. Childhood diabetes is now acknowledged to be a complex disorder with heterogeneity in its pathogenesis, clinical course and outcomes. While type 1 diabetes is the most frequent form of diabetes among Caucasian children, measurements of diabetes autoantibodies and C peptide are necessary to better define the types of diabetes in youth.

CONTINUOUS SUBCUTANEOUS INSULIN INFUSION (CSII) IN YOUNG CHILDREN WITH TYPE 1 DIABETES

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Background: The use of CSII in young children has been less frequent than in adolescent population although has been proved that in pediatric age is an effective therapeutic alternative to multiple daily injection (MDI).

Aim: The purpose of this study was to evaluate the feasibility of CSII treatment in young children (<10 years old) with type 1 diabetes in comparison to MDI treatment that the same patients have used before the pump therapy in routine clinical practice.

Methods: In a retrospective study we reviewed the data from 11 paediatric patients with type 1 diabetes (7 males and 4 females, mean age 8.4+/-1.3years, range 5 to 10 years; diabetes duration 4.3+/-1.9 years) treated with CSII (Disetronic H-TRON V 100) for 1.6+/-1.2 years. All patients were in MDI treatment (4 insulin injections for day) before starting the CSII. HbA(1c) levels (at three month's intervals), BMI values and insulin doses were collected during regularly scheduled visits. The last year of MDI treatment was compared with the first year of pump therapy; the data were analyzed using paired t-test

Results: There was a significant reduction in the average HbA(1c) values for the year during pump therapy versus the average HbA(1c) values for the year before the CSII (7.9+/-0.2 vs 8.3+/-0.3; p=0,008). Three months after CSII initiation, the HbA(1c) levels were significantly reduced versus HbA(1c) values at CSII therapy onset (8.0+/-0.3 vs 8.5+/-0.4; p=0.03). No significant difference was observed in the HbA(1c) values at 6 and at 12 months after CSII initiation versus HbA(1c) values at CSII therapy onset (7.9+/-0.3 at 6 months vs 8.5+/-0.4 at CSII onset; p=0.12 and 8.0+/-0.2 at 12 months vs 8.5+/-0.4 at CSII onset; p=0.18). The patients exhibited a no increase in BMI values during the period of CSII treatment (18.8+/-0.6 at 6 months vs 18.7+/-0.5 at CSII onset; p=0.2 and 19.1+/-0.5 at 12 months vs 18.7+/-0.5 at CSII onset; p=0.1). The insulin requirement dropped by 9% (0.81+/-0.2 UI/kg/day before starting the CSII; 0.74+/-0.1 UI/kg/day at 12 months after CSII initiation).

Conclusion: CSII therapy improve the glycemc control in young children with type 1 diabetes and it is an effective therapeutic alternative in routine pediatric diabetes care.

CSII VS. MDI: PSYCHOLOGICAL IMPACT AND QUALITY OF LIFE IN ADOLESCENTS WITH TYPE 1 DIABETES

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Background: In adolescents with Type 1 Diabetes, continuous subcutaneous insulin infusion (CSII) is being used increasingly demonstrating to be a suitable alternative therapy to multiple daily injection (MDI) regimes.

Aim: The purpose of this study was to investigate quality of life and psychological impact of insulin pump therapy compared to MDI-treatment in adolescents with Type 1 Diabetes.

Methods: We assessed depression, perceived well being and self-perception in forty-six adolescents with type 1 diabetes (20 females and 26 males; mean age 16,0 +/- 3,1 years; diabetes duration 7,3+/-3,6 years), using respectively three test instruments: VAMS (Visual Analogue Mood Scale, range score 0-100); WHO(10)WELL BEING INDEX (range score 0-30) and RSES (Rosemberg Self Esteem Scale, range score 0-40). Twenty-three patients were treated with CSII (for 12,3+/-2,3 months) and twenty-three patients (control group) with MDI (for >12 months). The two groups were matched by sex, age and disease duration; the data were analyzed using paired student t-test.

Results: There was a significant lower VAMS-score in CSII group compared to control group (14,3+/-3,8 vs 24,2+/-4,5; p=0,04). The WHO (10)WELL BEING INDEX-score was 21,6+/-1,1 in the CSII group vs 19,2+/-0,6 in control group (p=0,05). However no significant difference was observed in the RSES-score among the two groups (CSII: 32,2+/-1,1 vs MDI: 32,0+/-0,9; p=0,9).

Conclusion: This study suggests that the CSII-treatment compared to MDI-treatment has a better positive effect on the mood and depression levels and improves more the perception of well being in adolescents with type 1 diabetes.

THE EPIDEMIOLOGY OF TYPE 1 DIABETES MELLITUS IN SHANGHAI CHILDREN: A TWO DECADES RETROPECTIVE

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Background: Type 1 diabetes mellitus (T1DM) is one of the most common worldwide endocrine disease of children. The incidence of childhood T1DM in the urban districts of Shanghai was once reported to be the lowest in the world. As Shanghai has been the largest and developed metropolis in China, the longitudinal epidemiological changes may provide an estimated profile what other developing cities around China will confronting with in the future.

Aim: To study the incidence of childhood T1DM among children aged 0-14 years from 1997-2000 in urban Shanghai, and to compare the longitudinal epidemiological data since 1980.

Methods: A retrospective study on the incidence of childhood T1DM among children aged 0-14 years was carried out from 1997-2000 in urban Shanghai. "Capture-recapture" method was used in line with DIAMOND protocol with independent validation of complete case ascertainment. The ascertainment corrected total number was calculated as: $N = [(M+1)*(n+1)/(m+1)] - 1$ (M: primary source case, n: second source case, m: common case from the both sources).

Results: 79 cases were found from the primary source and 78 cases from the second source with 58 in common during 1997 and 2000. The aggregated number of unique cases from both sources was 97. The estimated ascertainment corrected total number was 103 cases using the Capture-recapture method. The average annual crude incidence was 1.56/100,000.

Conclusion: From the year 1980-1991, the average annual T1DM crude incidence in Shanghai was 0.61/100,000, and 0.83/100,000 in the year 1989-1993, 1.21/100,000 in the year 1988-1996 respectively. An obvious increasing incidence of childhood T1DM was seen in the urban of Shanghai during the last two decades. Considering the quick changes of economic status in Shanghai during the last two decades, such environmental factors as economic development may affect childhood T1DM incidence directly or indirectly.

COMPARISON OF CARDIOVASCULAR RISK FACTORS BETWEEN TYPE 1 AND TYPE 2 DIABETES OF THE YOUNG PATIENTS

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Background: Type 2 diabetes mellitus is a known cardiovascular risk factor in adult patients. In recent years, the morbidity of type 2 diabetes mellitus has increased among children and adolescents in Japan. We evaluated the difference in risk factors for cardiovascular disease between type 1 and type 2 diabetes in adolescent patients.

Aim: To compare cardiovascular risk factors between type 1 and type 2 diabetes in adolescent patients.

Methods:

17 type 1 (6 males and 11 females, age 19.2 ± 2.5 y.o.) and 23 type 2 (8 males and 15 females, age 19.7 ± 3.0 y.o.) diabetic patients were studied. The duration of the disease was more than 5 years for all subjects. Carotid artery intima-media thickness (IMT) was measured using 7.5MHz high-resolution B-mode ultrasound for each patients. Blood samples were also obtained for blood glucose, HbA1c, serum lipids and adipocytokines (adiponectin and plasminogen activator inhibitor-1(PAI-1)).

Results: IMT was significantly greater in type 2 diabetes patients (0.55 ± 0.09 vs. 0.49 ± 0.06 mm, $p=0.024$). PAI-1, which is presumably atherogenic, was significantly higher (36.3 ± 17.6 vs. 19.5 ± 8.4 ng/ml, $p=0.0015$) and adiponectin, that is presumed to prevent atherogenesis, was significantly lower (7.1 ± 3.1 vs. 9.3 ± 3.4 μ g/ml, $p=0.040$) in type 2 diabetic patients.

Conclusion: Even in adolescent patients type 2 diabetes mellitus is associated with greater risk factors for the development of cardiovascular diseases than type 1 diabetes.

ANALYSIS OF CHOSEN IMMUNOGENETIC FACTORS IN DIABETES TYPE 1/NON DIABETIC SIBLINGS PAIRS

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Background: Type 1 diabetes is thought to be a progressive autoimmune disease.

The aim of the study was searching for immunogenetic differences between children group with type1 diabetes and their non diabetic healthy siblings .

Material and methods: 33 diabetes type 1/non diabetic sibling pairs were selected; 18 HLA-DR/DQ matched and 15 HLA-DR/DQ haploidentical sib pairs, with "high risk" DRB1*03-DQB1*02 or DRB1*04-DQB1*03 haplotype. PCR-SSP method for HLA-DRB1*, DQB1*, TNF- α , IL-10, IL-6 and IFN- γ genotypes identification was used. Healthy persons (N=36) typed for cytokine TNF- α , IL-10, IL-6, IFN- γ genotypes were the control group.

Results: Table 1 Cytokine secretion profile in diabetes type1 children group and their non diabetic siblings

Genetic controlled cytokine synthesis	Diabetes Type 1		Healthy siblings		Control group	
	N =33	%	N =33	%	N =36	%
TNF α "high" secretion	14	42,42	13	39,39	10	27,77
TNF α "low" secretion	16	48,48	17	51,51	26	72,23
IL-10 "high" secretion	2	6,06/p<0.05	2	6,06	10	27,70
IL-6 "low" secretion	3	9,09	6	18,18	10	27,77
IFN γ "high" secretion	5	15,15	6	18,18	10	27,77

Cytokine genotypes associated with the cytokine secretion profile in HLA matched and haploidentical diabetes type1/non diabetic sib pairs carrying DRB1*03-DQB1*02 or DRB1*04-DQB1*03 haplotype were examined and checked with control group.

Conclusions: Children with diabetes type 1 differ from healthy siblings and control group in IL-6 secretion profile .Matched and mismatched cytokine genotypes in HLA identical and haploidentical diabetes type 1/non diabetic sibpairs seems to be similar.

KBN grant: Nr4/PO5E073/18

COELIAC DISEASE IN CHILDREN AND ADOLESCENTS WITH
TYPE 1 DIABETES MELLITUS- A MULTICENTER CASE
CONTROL STUDY

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Background: The prevalence of celiac disease (CD) in children with diabetes mellitus type I (DM) is significantly higher than in the non diabetic population. Most of the patients with DM and associated CD do not suffer of typical gastrointestinal symptoms. There is no agreement on the necessity of screening and treatment of silent CD in DM. Only few data on follow-up in diabetic children with silent CD exist.**Methods:** 98 diabetic patients (54 males and 44 females) from 11 centers were diagnosed having potential or silent CD by screening with EMA or ATGA or in case of IgA deficiency by IgG gluten antibodies and subsequent biopsy.(= cases) For each case two controls in the same center were chosen, (stratified by age and age-at-DM onset) who had been screened for EMA / ATGA negatively during the same period.(n=195, 94 males, 98 females).Metabolic control (HbA1c), insulin dosage and acute complications as severe hypoglycaemia and ketoacidosis were documented every 6 month at least for one year of follow up in a standardised form.**Results:** Mean age of diabetes manifestation was $6,47 \pm 4,1$ years for case and $6,52 \pm 3,99$ for the controls (n.s.). Diagnosis of CD defined as positivity for EMA or ATGA was made at $10,02 \pm 5,39$ years. Biopsy showed in n = 74 total or subtotal atrophy, n= 13 IEL and in 7 cases normal mucosa. In 2 cases no clear result was possible due to technical reasons and in 2 further cases no biopsy was performed.The mean observation period after the diagnosis CD was $3,26 \pm 1,86$ years. Mean HbA1c levels were similar in the cases and in the controls ($8,63 \pm 1,45$ % vs $8,50 \pm 1,39$ %, p = 0,35). There was also no difference in the frequency of severe hypoglycaemia (p = 0,32) and of ketoacidosis (p = 0,81).The applied insulin dosage was comparable in both groups of patients ($0,71 \pm 0,19$ IU/kg vs $0,72 \pm 0,19$ IU/kg, p = 0,45). **Conclusion:** There was no obvious influence of the second disease on the metabolic control of the patients.

PREVALENCE OF RETINOPATHY AND NEPHROPATHY IN CHILDREN AND YOUNG ADULTS WITH TYPE 1 DIABETES MELLITUS

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One of the main aims of diabetic care is to prevent “late” diabetic complications and reduce their risk factors. **Aim:** To estimate the prevalence of chronic microvascular complications (retinopathy and nephropathy) in children and young adults with type 1 diabetes mellitus and its relationship to diabetes duration, state of puberty, blood pressure and metabolic control. **Methods:** 329 patients (170 M, 159 F) at the age $17,9\pm 4,2$ and duration of diabetes 5-20 years (mean $9,9\pm 3,8$ years) were included into study after 5 years of observation. In all patients funduscopy was performed every year and fluorescein angiography - at the end of study in most patients. Albumin excretion rate was determined by RIA (overnight collection), HbA1c by HPLC and plasma lipids by enzymatic method. **Results:** The background retinopathy was diagnosed in 38 patients (11,5%), preproliferative in 3 individuals (0,9%) Microalbuminuria was determined in 16 patients (4,7%), macroalbuminuria in 1 patient. Microangiopathy was determined in 46 individuals (14%): in 3,6% individuals with diabetes duration 5–10 years, in 24,5% with duration 10-15 years and 42,9% with duration 15-20 years ($p<0,01$). The complications were observed in 22,8% postpubertal patients, in 4,9% pubertal and in nobody in prepubertal period. To identify risk factors of microvascular complications we compared group of patients who developed the complications and the group of diabetics (adjusted for age and diabetes duration) who remained free of complications. In group with complications during last five years we noticed higher level of mean HbA1c (9,2 vs. 8,1% $p<0,001$), plasma cholesterol (5,0 vs. 4,4 mmol/l; $p<0,01$), LDL-Ch (2,9 vs. 2,5 mmol/l; $p<0,05$), triglycerides (1,1 vs. 0,9 mmol/l; $p<0,05$), and higher blood pressure (SBP 123 vs. 119 and DPB 79 vs. 74 mmHg; $p<0,05$). **Conclusion:** In type 1 diabetic patients retinopathy was found more frequent than nephropathy. The prevalence of complication increased rapidly in post pubertal period and in group of patients with duration of diabetes above 15 years. Insufficient metabolic and lipid control and increased blood pressure could be the risk factors of microvascular complications.

Supported by Research Grant of Medical University of Lodz 502-11-664

**SEVERE (IMMUNOLOGICAL?) ATROPHIC GASTRITIS,
LEADING TO GASTRECTOMY, IN A DIABETIC BOY**

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Background: The risk of organ-specific autoimmune disease is increased in people with type 1 diabetes, and includes gastric autoimmunity characterised by the presence of gastric parietal antibodies (PCA) which are markers of atrophic gastritis.

Aim: We report a unique case of severe atrophic gastritis in a young insulindependent diabetic boy, without PCA nor other autoantibodies, but with atypical gastric autoimmune manifestations.

Case report: JD is a European Caucasian 15-year-old boy, having a non-homozygous twin, without a particular family history. At the age of 22 months, he became diabetic, without residual insulin secretion, even if his HLA-DQ genotype was not at increased risk for type 1 diabetes (DQA1-DQB1.2/DQA1-DQB1.AZH) and if there were no increased levels of ICA and IAA. HbA1c remained between 6 and 7 %. At the age of 7 years, he presented hepatitis of unknown origin. At the age of 8.5 years, a severe exfoliating haemorrhagic gastritis was diagnosed and a nutritional gastric by-pass was performed. Histologically, the gastric mucosa was devoid of epithelium, and the lamina propria was heavily infiltrated by neutrophils, eosinophils and lymphocytes. The search for the etiopathogeny excluded infectious agents, caustic attack, or vasculitis. Extended screening for autoantibodies, including PCA, or allergic markers, was not contributive. However, there was increased interferon- γ and TNF- α secreting cells, suggesting cytotoxic activity. Prednisolone and ciclosporin were prescribed, with a slight improvement, but aggravating failure to thrive. Faced with the development in the stomach of both an intestinal metaplasia in the antrum and a œsophagal-like mucosa in the upper part of the stomach, a total gastrectomy was performed at age 14.8 years.

Conclusion: This is a unique case of non-autoimmune insulindependent diabetes associated with a severe atrophic gastritis without PCA, and mucosal metaplasia. However, the hyperactivation of interferon- γ and TNF- α secreting cells, suggests an unknown autoimmune process.

PHYSICAL DEVELOPMENT OF NEWBORNS AND INFANTS BORN TO DIABETIC MOTHERS.

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The aim of the study is : 1.the prospective evaluation of chosen indices of physical growth of 103 newborns born to diabetic mothers during 1 years observation.2. – the assessment of influence of class of maternal diabetes –acc. to White to physical development of children.

Material: 103 infants born to diabetic mothers. The children were divided into 3 groups acc. to class of maternal diabetes . Consequently the following groups were established: 41 infants of gestational diabetes mothers (GDM), 44 infants of mothers with class B,C, and the group of 18 children born to mothers with severe diabetes D-F. The diabetic women during pregnancy were treated by intensive insulintherapy or only by diet and well controlled.

Methods: The physical growth (body weight, length, Symmetry Index)was assessed for each child at age 0, 6, 12 months of life and compare to norm acc. to Tanner & Whitehouse and between groups.

Results: Macrosomy (above 90 percentile) revealed 23 (22.3%) of newborns , mainly children of mothers class B,C, excessive height 43 (41.7%) and microsomy only 1.9%. of them. Symmetry Index was between normal range. During 1- year observation 8 from 23 children normalized their body mass , but still 15 infants were overweight at age of 12 months and 17 were to tall . In newborn's period only 2 (1.9%) infants were microsomic acc. to body weight and 5 acc. to body height but at age of 12 months the number of small children increased up to 15 and 17 respectively. The evaluation of physical growth of children acc. to class of maternal diabetes revealed that the mothers with class B,C, more frequently born macrosomic infants.

Conclusions: 1. The newborns of diabetic mothers still revealed excessive physical growth acc. to body weight and body length.

2 .The normalization of physical development of children of diabetic mothers occurred in most cases at age of 12 months.

3. The class of maternal diabetes acc. to White influence physical development of child. It could be important in education of parents to avoid children's obesity.

CARDIOVASCULAR AUTONOMIC DYSFUNCTION IN OBESE CHILDREN

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Background: Obesity is associated with an increased incidence of type 2 diabetes, hypertension, unexplained death, as well as an overall increase in mortality rate. The autonomic nervous system is involved in the regulation of energy metabolism and cardiovascular system activity. Obese persons often have an alteration in their autonomic nervous system which can account for several clinical consequences of obesity. Long before the appearance of clinical signs of autonomic neuropathy, subclinical signs can be detected.

Aim: To evaluate the occurrence of autonomic nervous system dysfunction, subclinical signs of autonomic neuropathy in obese children.

Methods: 47 obese children (age: 13.4 ± 2.53 years, body weight: 81.6 ± 16.3 kg, body fat: 32.9 ± 8.1 kg [mean \pm SD]) with different cardiovascular risk factors were investigated. Resting heart rate, heart rate variation to deep breathing, heart rate response to standing from a lying position, fall in systolic blood pressure on standing, and rise in diastolic blood pressure during sustained handgrip were measured.

Results: Using reference ranges obtained in normal weight controls (Barkai et al, Arch Dis Child 1995; 73: 515-518), 19 obese children (40%) had at least 2, and 5 obese children (10.6%) had 3 abnormal autonomic test results.

Conclusion: Cardiovascular autonomic dysfunctions are detectable in obese children. According to the preliminary results further investigations are needed to clarify subgroups being at risk of autonomic dysfunctions.

JUGULAR BULB OXYMETRY BUT NOT CRANIAL
COMPUTERTOMOGRAPHY DETECTED CEREBRAL PERFUSION
DISTURBANCE AFTER HYPEROSMOLAR COMA IN A 18
MONTHS OLD DIABETIC CHILD

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Background: Hyposmolar coma remains a challenge in treatment of young diabetic children. Brain edema following fluid resuscitation may compromise cerebral perfusion seriously. Computer tomography is considered of important diagnostic value in these cases.

Case report: A 18 month old diabetic child was admitted with hyperosmolar coma and blood glucose (BG) of 1262 mg/dL and base excess (BE) of - 19. Despite completion of treatment resulting in BG of 258 mg/dL, BE of - 5 and a normal cranial computertomography the child remained unconscious. Jugular bulb oxymetry disclosed desaturation with 39% along with continued dysfunction in electroencephalography. Improvement of cerebral perfusion by volume expansion, use of inotropes and enhanced oxygenation by artificial ventilation resulted in complete restoration of neurologic function.

Conclusion: Even in face of normal cranial computertomography cerebral perfusion disturbance may persist after treatment of hyperosmolar coma in children. Jugular bulb oxymetry may be of diagnostic value for detection and guidance of therapy.

EXPLORING THE EXPERIENCES OF ADOLESCENTS LIVING WITH TYPE 2 DIABETES

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Background: Over the past two decades, the prevalence of type 2 diabetes among children and adolescents has been rising. Very little research has been done on the management practices of adolescents with type 2 diabetes.

Aim: To explore the experiences of adolescents living with type 2 diabetes.

Methods: Participants between the ages of 12-18 were recruited through their physician at the B.C Children's Hospital Diabetes Clinic. Each participant was interviewed for 60-90 minute to describe their management experiences and experiences with the clinic. The interviews were tape-recorded, then transcribed verbatim. Data was managed using ATLAS.ti, then analyzed using qualitative methods. The research was approved by B.C Children's Hospital and the University of British Columbia in Vancouver, British Columbia and informed consent was obtained from parents and all participants.

Results: Eight participants (4 female and 4 male) were from various ethnic backgrounds including: Asian, Caucasian, Aboriginal and East Indian. Their Body Mass Index (BMI) ranged from 27-45 kg/m². Changes were made to different aspects of diet, exercise and medication management. The main dietary obstacles included: the desire for sugar/sweet foods; moods/emotions; and family member's food patterns. Exercise was difficult because of their size/weight, feelings of insecurity with regards to taking part in activities and getting motivated. Reasons for medication "non-compliance" and poor adherence to glucose testing were not remembering and the fear of needle pokes. Facilitators to making changes included: realizing the potential health risks of diabetes in the future and the impact it had on their family members and visits to the Diabetes Clinic. Other resources included: an interactive web site, a chat line, diabetes camp and cooking/meal preparation classes.

Conclusions: The adolescent's perspectives on the management of their diabetes varied during the course of their illness. The goals, strategies and evaluation of their progress will need to be tailored to each individual as they progress through each stage. These findings will add to a greater understanding of their educational needs. Lastly, these are preliminary findings and the study will explore the views of other adolescents and of the health professionals.

**THE PRESENCE AND THE TIME TREND IN THE
NUMBER AND BMI OF TYPE 2 DIABETES IN CHILDREN
AND ADOLESCENCE COMPARED WITH PATIENTS
WITH TYPE 1 DIABETES IN JAPAN**

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Background The incidence of type 2 diabetes mellitus (T2DM) is higher in young Japanese than in young Caucasians. Since we reported the age of onset and type of Japanese younger diabetic patients in our Diabetes Center in 1990, we have identified the existence of early-onset T2DM patients who develop severe diabetic vascular complications in thirties (Diabetes Care 20:844, 1997) and the higher incidence rate of diabetic nephropathy in early-onset Japanese T2DM patients than that in Pima Indian T2DM or Caucasian T1DM patients of comparable age (Diabetes Care 21:1080, 1998). Early-onset T2DM was defined here as type 2 diabetes mellitus diagnosed according to WHO criteria in children and adolescence when patients were found not to be ketosis-prone, to be free from insulin treatment for more than 1 year after the diagnosis of diabetes, and/or to exhibit preserved insulin secretion even when using insulin. The number of patients with T1DM and T2DM diagnosed before the age of 30 registered from 1960 to 1999 in our center were 1311 and 1911, respectively. The numbers of patients diagnosed before 1978, from 1979 to 1988, and from 1989 to 1999 were 1036 (type 1: type 2=1:1.66), 1217 (1:1.32), and 959 (1:1.45), respectively. All the patients with T2DM have been diagnosed after the age of 8. The numbers of patients with T1DM and T2DM intersected each other on the onset age at 14-15 years in the group diagnosed before 1978, on the onset age at 14-19 with 2-time crossings in the group from 1979 to 1988, and on the onset age at 15-20 with 4-time crossings in the group from 1989 to 1999. After the age of 20, the number of patients with T2DM surpassed that with T1DM. The % number of T2DM patients with past max BMI ≥ 30 at each onset age were higher in the group from 1989 to 1999 than that in the group before 1978. These findings indicate that T2DM patients were present in children and adolescence from 1960's, who have been getting obese in chronological order.

**PATHOGENESIS , PREVENTION AND TREATMENT FOR
DIABETES MELLITUS IN PRADER-WILLI SYNDROME**

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Background:Patients with Prader-Willi Syndrome (PWS) frequently develop diabetes due to the massive obesity, which is associated with hyperphagia.

Aim:To study the pathogenesis and suitable means for prevention and treatment of diabetes in PWS.

Methods:Ten patients with PWS, 6 males and 4 females, aged $22.5\pm 8.3(11-35)$ years at the time of study were investigated. We examined clinical features leading to diabetes, and how to treat and manage obesity and diabetes in PWS.

Results:1) The mean BMI was $28.6\pm 9.1(17.5-43.8)$ in the ten patients. Seven patients were obese with BMI ≥ 25 (four with BMI ≥ 30), whereas three were non-obese with BMI < 20 . 2) The mean value of basal IRI was $16.0\pm 6.5(1.4-29.0)\mu\text{U/ml}$ and that in peak IRI in OGTT was $53.6\pm 33.7(6.9-120.0)\mu\text{U/ml}$ during subsequent management in these 10 subjects.3) Five patients finally developed a diabetic type in OGTT. The mean age was $17.8\pm 3.6(15-23)$ years and the mean BMI was $27.1\pm 8.2(20.3-43.8)$ at the onset of diabetes. The development of glucose intolerance seemed to relate to the severity of the obesity and hyperinsulinemia. 4) Three non-obese patients showed neither glucose intolerance nor excess secretion of insulin. Thorough nutritional management and full family cooperation from early childhood were indispensable to prevent the occurrence and the progression of obesity in the three patients. 5) Caloric restriction was practically difficult and an anorectic agent, mazindol, had transient or little effect for reducing excessive appetite. 6) Metformin was more effective than sulfonylureas to improve hyperglycemia. There were no side effects of metformin including lactic acidosis. One patient was treated with two daily injections of pre-mixed insulins.

Conclusion:1) Hyperinsulinemia associated with obesity appears to relate to the development of diabetes in PWS. 2) Weight control through diet is extremely difficult to enforce in PWS. Educational program and family cooperation from early childhood are needed to reduce excessive food intake. 3) Metformin is considered to be useful in controlling hyperglycemia in PWS.

INSULIN PUMP THERAPY IMPROVES DIABETIC CONTROL AND QUALITY OF LIFE IN CHILDREN WITH TYPE I DIABETES MELLITUS (TYPE I DM)

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Background: In recent years, insulin pump therapy (IPT) has become one of the options for intensive diabetic control in children with Type I DM.

Aim: To evaluate the impact of IPT on quality of life and diabetic control in children previously treated with 3-4 daily subcutaneous insulin injections.

Methods: The effect of IPT on quality of life was determined through self- and/or parent-report for 69 patients (aged 2-19 years) on pump therapy for up to 2 years. The patient (or family member for younger children) was asked a series of questions concerning aspects of daily living and how the pump has changed their life, either positively or negatively. The effect of IPT on diabetic control was determined by comparing HgbA1c levels at baseline, 3, 6, and 12 months in a subgroup of 33 patients for whom data were available for all time periods. These patients were divided into 3 age groups: <11 years (n=10), 11-12 years (n=9), and 13-19 years (n=14). The change over time in HgbA1c levels for the age groups was analyzed with a two-way ANOVA with repeated measures across time periods, followed by Bonferroni multiple comparison tests to identify differences between each time period.

Results: HgbA1c levels significantly improved from baseline (8.9 ± 0.8 %, $M \pm SD$) in the 3 age groups combined ($p < 0.001$) after 3 (7.8 ± 0.7), 6 (7.9 ± 1.2), and 12 months (8.3 ± 1.4). There were no significant differences in HgbA1c between the 3, 6, and 12 month periods. The 3 age groups' HgbA1c changed in a similar manner across time (interaction $p = 0.21$). Patients were uniformly satisfied with the pump. Only 1 of 69 briefly returned to subcutaneous injections after starting IPT, and then began IPT again. All patients expressed satisfaction due to greater flexibility with timing of meals and amount of food they could eat. All patients also liked the fact that the need for frequent subcutaneous injections was eliminated. Younger patients (<10 years) expressed that pump therapy made them feel "more normal", but could not define the term normal.

Conclusion: Insulin pump therapy allows children with Type I DM to achieve better diabetic control and improves their quality of life.

THYROID DISEASES AND AUTOIMMUNITY IN ADOLESCENTS WITH TYPE 1 DIABETES FROM MINSK.

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Background: Thyroid diseases especially autoimmune are common in adolescents with type 1 diabetes. The problem of postchernobyl thyroid carcinoma is still actual in Belarus. Aim: To investigate the thyroid function and the prevalence of thyroid antibodies in adolescents with type 1 diabetes from Minsk. Patients and Methods: 70 consecutive adolescents (43 females and 27 males) with type 1 diabetes were investigated. Median age was 16,9 (15-19) years. Diabetes duration was 4 (0,5-15) years. Ultrasonography (US) was performed in all patients. Thyrotropin stimulation hormone (TSH) was measured in 62 adolescents (F:M=41:21), antibodies against thyroglobulin (TgAb) and thyroid peroxidase (TPOAb) in 51 patients (F:M=33:18). TSH and TPOAb were measured by immunoenzyme method (cut-off value for TPOAb 34 U/ml), TgAb by RIA method (cut-off value 50 U/ml). Fine-needle aspiration (FNA) under US guidance was performed in 2 patients with nodule. Control In 25 healthy adolescents TPOAb and TgAb were measured. Results: TSH was in normal range in 60 patients (96,8%). Suppressed level was detected in 2 girls (in one with subclinical hyperthyroidism and in the second on the therapy with L-thyroxine 200 mcg after total thyroidectomy performed in 2000 because of thyroid carcinoma). TPOAb were increased in 7 females (13,7% patients). TgAb were slightly increased in 31 adolescents (59,6%, F:M=21:10). In control group TPOAb and TgAb were in normal range. US revealed changes like autoimmune thyroiditis in 9 patients (12,9%, F:M=7:2), isolated thyroid hypoechogenecy in 13 patients (18,6% F:M=11:2), 1 cyst and 2 nodulus in females. The thyroid volume was in normal age range in all cases. Results of FNA: 1th case girl 18 –thyroiditis, 2th case girl 17 –suspicious for papilar carcinoma (this patients was directed to oncologist). High level of TPOAb was detected in 5 patients with US sings of thyroiditis and in 2 without them. There is no correlation between duration of diabetes and TPOAb Conclusion: Prevalence of US changes and thyroid antibodies confirms the importance of regular follow up in adolescents with type 1 diabetes for thyroid autoimmune diseases and as a special need of Belarus region for early stage of thyroid carcinoma.

IS THERE AUTONOMIC DYSFUNCTION IN ADOLESCENTS WITH TYPE 1 DIABETES AND MICROALBUMINURIA?

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Background: The presence of autonomic neuropathy has been correlated with microalbuminuria (MA) in adults with type 1 diabetes (T1DM), however, little is known for adolescents with the disease.

Aim: The purpose of the study is to evaluate the existence of autonomic neuropathy in adolescents with T1DM and MA

Methods: The study comprised 86 patients (39 males) with T1DM (mean age and duration of disease 18.4 and 9.5 years respectively) and 40 (14 males) controls (mean age 19.7 years) with comparable body mass index (BMI). HbA1c and albumin excretion rate during the day and night were evaluated. Autonomic neuropathy was assessed by RR interval variation during deep breathing (RRVDB), RR variation in the Valsalva maneuver, 30/15 ratio and systolic blood pressure response to standing (SBPRS). Systolic (SBP), diastolic blood pressure and pulse rate at lying position were also recorded.

Results: RRVDB was significantly decreased in patients (n=8) with night time MA (NMA >20 µg/min) compared with the controls but not with those without NMA (mean±SD 22.0±6.0 vs 31.0±7.4 vs 28.0±10.2, p=0.014). Patients with persistent daytime MA (DMA>20 µg/min) (n=13) had significantly decreased RRVDB compared with those without and the controls. RRVDB had a marginally significant negative correlation with NMA (p=0.0066), but not with the disease duration, HbA1c, sex, BMI or Tanner stage. Valsalva maneuver, 30/15 ratio and SBPRS were not different among patients with DMA or NMA, those without and the controls. Patients with NMA or persistent DMA had significantly increased SBP (p=0.003 and p=0.002 respectively) compared with those without and the controls. Significantly greater number of patients with NMA or persistent DMA had pulse rate >2SD above the mean of the control value (p=0.037 and p=0.024 respectively) compared with those without.

Conclusions: RRVDB is significantly decreased in adolescents with T1DM and NMA or persistent DMA, suggesting that autonomic dysfunction can be evident very early in the course of the disease and is related to the presence of MA.

EVALUATION OF INSULIN, ANTIINSULIN ANTIBODIES CONCENTRATIONS AND SOMATIC DEVELOPMENT PARAMETERS IN HYPERTROPHIC NEWBORNS OF MOTHERS WITH DIABETES TYPE 1, GESTATIONAL DIABETES AND OF HEALTHY MOTHERS

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Metabolic disorders in pregnant woman affect both foetal development, as well as the extrauterine growth of child.

The aim of the studies was an assessment of somatic development, insulin level, and antiinsulin antibodies (IAA) titre in children with birth-weight above 97 percentile from normal mothers, from mothers affected by with gestational diabetes mellitus (GDM) and from those with diabetes mellitus type 1(DM1).

Methods: The studies comprised 30 healthy infants, born with macrosomy, whose mothers had no diabetes in gestation and during 6 subsequent months after delivery. There were 36 hypertrophic newborns from mothers with GDM and 30 hypertrophic newborns from mothers with DM1, in whom HbA_{1c} was below 7 in the 3rd trimester. Twenty five normal and full-term, eutrophic neonates stood for control. The evaluation included BMI of both parents, somatic development parameters of the newborns, Quetelet's index, glucose and insulin concentrations in the 1st and the 12th month of life, and IAA in the 12th month of life. Insulin and IAA were determined by immunoenzymatic methods (the MEIA and the ELISA).

Results: Hypertrophic children of healthy mothers and those with GDM revealed significantly higher values of Quetelet's index, observed in the 6th and the 12th month of life, than that children from mothers with DM1 and the one in controls. Insulin concentrations, determined in the 1st and 12th month of life in the studied groups, were not statistically different from those observed in the control group. The concentrations of IAA were statistically significantly higher in the group of children from mothers with GDM vs. those in the control group ($p < 0.05$). Among the breast-fed children, the infants from mothers with DM1 demonstrated a slightly higher Quetelet's index than that observed in the control group. In turn, all the mixed nutrition children revealed significantly higher values of Quetelet's index than those found in the breast-fed children. The mean concentration of the antiinsulin antibody titres was naturally lower in the breast-fed children (12.5 ± 23.7 U/ml) than those in mixed nutrition children (15.9 ± 21.2 U/ml). A positive correlation was observed between IAA concentration and body weight in the 12th month of life ($r = 0.63$; $p < 0.05$).

Conclusions. 1. The growth dynamics of hypertrophic newborns from mothers with DM1 differs from that, observed in the groups of normal and GDM mothers. 2. Hyperalimentation should be considered as one of the causes of insulin antibody generation. 3. Promotion of breast feeding is highly recommended, especially in population of macrosomic children.

DOES CSII GIVE A CHANCE TO IMPROVE QUALITY OF LIFE AND SATISFACTION WITH TREATMENT? DIFFERENCES IN PERCEPTION DETECTED IN ADOLESCENTS AND PARENTS OF DIABETIC CHILDREN.

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Introduction: Diabetes is the disease where the deterioration of life quality and higher anxiety is observed in patients and families. New methods of treatment (CSII among) aim at improving medical care but also promise better quality of life. **Aim:** The aim of the study was to examine the feeling of satisfaction (with treatment and life) and anxiety level in parents of diabetic patients and adolescents with IDDM using different treatment methods (MDI vs. CSII). **Method:** Subjects filled in the quality of life questionnaire and State-Trait Anxiety Inventory (STAI). N adolescents: 62 (26 CSII; and 36 MDI;) and N parents: 48 (23 children CSII and 25 children MDI). The level of HbA1c was measured. Parent's sex, child's sex, a year of diagnosis were controlled. **Results:** There was no significant difference between satisfaction with treatment), the quality of life and anxiety level in the group of adolescents. The level of HbA1c (Mean = 8.03 vs. Mean = 8.95) had a significant effect on the satisfaction with life no matter the method ($F=5.021$, $df=2$, $p<0.02$). Parents of children CSII are more satisfied with the treatment ($t=4.418$, $df=41$, $p<0.05$) and their life ($t=2.20$; $df=45$, $p<0.04$). There was no significant difference in the anxiety level. Mothers ($N=36$) are significantly less satisfied with their life than fathers ($t=2.618$, $df=15$, $p<0.02$). The sex of the child is not relevant. The lower child's HbA1c level and CSII - the greater satisfaction with life ($F=6.070$; $df=2$; $P<0.01$). Parents of children CSII presented the greater satisfaction with treatment no matter the child's age ($F=6.715$, $df=3$; $p<0.002$) and the year of diagnosis ($F=5.342$; $df=4$; $p<0.002$). The relationship between the anxiety level and the satisfaction with life was detected both in adolescents ($R=0.355$, $R^2=0.126$, $p<0.05$) and parents ($R=0.302$; $R^2=0.070$; $p<0.05$). **Conclusions:** Results indicate CSII improves the satisfaction with treatment and quality of life of parents of diabetic children but not adolescents. Parents perceive CSII as the last chance to help their children. The higher anxiety level results in the lower satisfaction with life both of adolescents and parents. The level of HbA1c plays a bigger role in the feeling of life satisfaction in adolescents. Results suggest diabetes is a psychological problem for adolescents.