

Different schemes of insulin therapy (CSII and MDII) in children with DM1 in a Dnipro city

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Background

Due to the Ukrainian Pediatric Diabetes Register (UPDR) the number of children with diabetes mellitus type 1 (DM1) 0-17 years old in 2018 was 9105 (1 in 835), with DM2 - 36 (1 in 211,000) with ND - 66 (1 in 115,000), with MODY - 40 cases (1 in 190,000). The DM1 prevalence rates increased from 9.3 (per 1000) in 2007 up to 12,57 (per 1000) in 2018.

Materials and methods

The UPDR was created in 2004. It contains all information about children with DM1 aged 0-17 y.o. including HbA1c levels, the frequency of acute complications (diabetes ketoacidosis (DKA) and severe hypoglycemia (SH), chronic complications (cataract (DC), retinopathy (DR), nephropathy (DN), peripheral neuropathy (DPN), steatohepatosis (DS), cheiroarthropathy (DCHA), angiopathy of legs (DA), absence of chronic complication (No CC), etc. We studied the frequency of acute and chronic complications of DM1 among 292 children aged 0-17 who were treated with continuous subcutaneous insulin infusion (CSII) (n=22) vs multiply daily insulin injections (MDII) (n=270) in the city of Dnipro.

Results

The incidence of DM1 in the city of Dnipro increased from 0.69 (per 10,000) in 2008 up to 1.07 (per 10,000) in 2018. At the same time, the pediatric population of Ukraine decreased from 10.3 million in 2002 to 7.6 million in 2018.

The total number of patients with DM1 in Dnipro is 292.

Among them, there are 190 children aged 0-14 years old (17 of whom receive CSII), and 102 adolescents (5 of whom receive CSII), (Fig.1).

The results showed the absence of a significant difference in the frequency of diabetes complications and HbA1c levels between CSII and MDII groups (p>0.05). However, a significant difference (p<0.05) in the frequency of complications (e.g. angiopathy of legs, peripheral neuropathy, cheiroarthropathy and HbA1c levels) was found in the 15-17 y.o. group (vs 0-14 y.o.) with the increase of the duration of DM1 (p<0.05), (Tables 1-2).

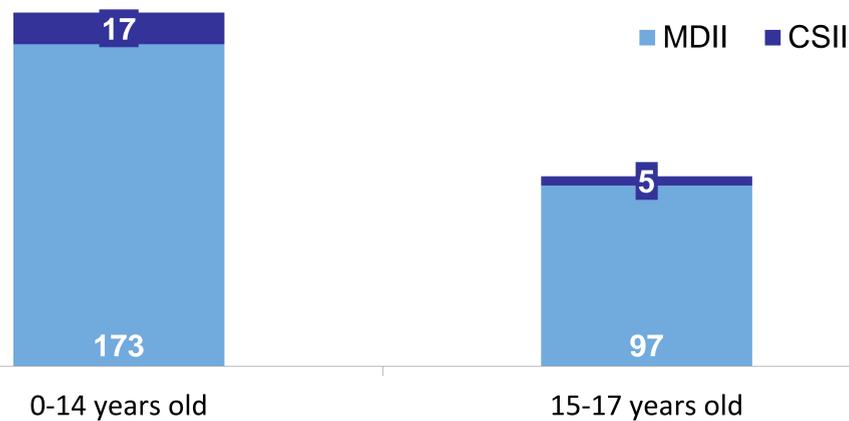


Fig 1. Number of children treated with CSII and MDII in different age

Table 1. Acute and chronic complications and HbA1c level between CSII and MDII (p>0.05)

CSII/MDII	Duration of DM	DR (retinopathy)	DN (nephropathy)	DA (angiopathy of legs)	DPN (neuropathy)	DCHA (cheiroarthropathy)	DKA (ketoacidosis)	SH (severe hypo)	HbA1c
CSII* (n=22)	5,8±2,3y.	0	4,55	13,64	36,36	9,09	0	0	7,88±0,79
MDII (n=270)	4±3,5 y.	7,04	4,07	14,81	14,81	5,93	4,07	0,37	8,42±1,24

Table 2. Acute and chronic complications and HbA1c level between CSII and MDII depending on the age (*p<0,05)

Age groups	Duration of DM	DR	DN	DA	DPN	DH	DKA	SH	HbA1c
0-14 y.o. (n=190)	3±2,9 y.	4,74	3,16	8,42	11,58	3,68	3,68	0	8,1±1,02
15-17 y.o. (n=102)	6±4,03 y.*	9,8	5,88	26,47*	33,33*	10,78*	3,92	0,98	8,8±1,4*

Conclusions

The study did not reveal any difference in the frequency of acute and chronic complications and HbA1c levels among patients with DM1 treated with CSII and MDII (duration of DM1 and age were similar).

The frequency of chronic complications and HbA1c level increases with the age and duration of DM1 (p<0.01).

Further treatment modalities should be studied in a pediatric cohort with DM1, especially in adolescents (15-17 y.o.).