

# The role of patient adherence to insulin pump therapy with long-term treatment of type 1 diabetes

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**Background:** Insulin pumps are widely used in the treatment of type 1 diabetes mellitus (T1D) in children because of numbers of advantages in compare with multiple daily insulin injections (MDI). However, the long-term efficacy of continuous subcutaneous insulin infusion therapy (CSII) in achieving and maintaining of diabetes stability is still not resolved

**Purpose:** Determine the effectiveness-related factors of glycemic control in a group of children and adolescents with T1D and CSII of 3 years and more

**Methods:** We investigate the data of 239 children and adolescent from St.Petersburg with insulin pumps during 3 or more years. We analyzed the dynamics of HbA<sub>1c</sub> level before and after pump therapy. HbA<sub>1c</sub> changes were evaluated depending on gender, patient age, baseline HbA<sub>1c</sub> level, as well as such factors as the frequency of using continuous subcutaneous glucose measurement (real-time CGM), temporary transitions from CSII to MDI by syringe pens, using a bolus wizard (BW)

**Results:** The obtained data of the last HbA<sub>1c</sub> value did not have reliable significant changes in comparison with the level of HbA<sub>1c</sub> before switching to the CSII (initial  $7.82 \pm 1.46\%$ , last  $7.93 \pm 1.30\%$ ). The number of patients with HbA<sub>1c</sub> <7.5% was 42%. The best indicators were observed in the group of 4.5–7 years old, where the number of patients with HbA<sub>1c</sub> <7.5% was 67%; in the 12–18 group, only 35% of people had target HbA<sub>1c</sub>. In the majority of patients with baseline HbA<sub>1c</sub> <7.5%, its last value remained targeted, while in patients with HbA<sub>1c</sub> ≥7.5%, before switching to CSII only 23% reached the target level. Also, the best glycemic control in patients who used CSII constantly, in comparison with patients who periodically switched to MDI using a syringe pen ( $p < 0.05$ ). HbA<sub>1c</sub> was lower in the group of adolescents 12–18 years old who used real-time CGM consistently, compared to the group that did not used of CGM ( $p < 0.05$ )

**Conclusion:** no statistically reliable significant change in the HbA<sub>1c</sub> level in children and adolescents on the CSII lasting 3 years or more compared with the initial value of HbA<sub>1c</sub> was detected. In the majority of patients with a target level of HbA<sub>1c</sub> (<7.5%) before switching to CSII, its last value remained within the target range, and in patients with an initial non-target level of HbA<sub>1c</sub> (≥7.5%), only 23% reached target values that may be due to insufficient adherence to treatment and self-control methods

