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

Elena Bashnina1, Irina Tsargsova1, Olga Klitsenko1, Olga Berseneva1, Mariia Turkunova2

1North-Western State Medical University named after I.I. Mechnikov, Saint Petersburg, Russian Federation
2Children Endocrinology Center, Saint Petersburg, Russian Federation

Background: Insulin pumps are widely used in the treatment of type 1 diabetes mellitus (T1D) in children because of the number 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 HbA1C level before and after pump therapy. HbA1C changes were evaluated depending on gender, patient age, baseline HbA1C 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 HbA1c value did not have reliable significant changes in comparison with the level of HbA1C before switching to the CSII (initial 7.82 ± 1.46%, last 7.93 ± 1.30%). The number of patients with HbA1C <7.5% was 42%. The best indicators were observed in the group of 4.5–7 years old, where the number of patients with HbA1c <7.5% was 67%; in the 12–18 group, only 35% of people had target HbA1C. In the majority of patients with baseline HbA1c <7.5%, its last value remained targeted, while in patients with HbA1c≥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). HbA1C was lower in the group of adolescents 12–18 years old who used real-time CGM consistently, compared to the group that did not use of CGM (p <0.05).

Conclusion: no statistically reliable significant change in the HbA1C level in children and adolescents on the CSII lasting 3 years or more compared with the initial value of HbA1C was detected. In the majority of patients with a target level of HbA1C (<7.5%) before switching to CSII, its last value remained within the target range, and in patients with an initial non-target level of HbA1c (≥7.5%), only 23% reached target values that may be due to insufficient adherence to treatment and self-control methods.