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Risk Factors for Diabetic Ketoacidosis in Children

Akademisk avhandling

Som för avläggande av doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i Sahlgrens aula, Blå Stråket 5, Sahlgrenska Sjukhuset, 413 45 Göteborg, den 6. December 2023, klockan 09.00

Av Johan Henrik Wersäll, avd. för anestesi och intensivvård, Inst. för Kliniska Vetenskaper, Göteborgs Universitet

Fakultetsopponent: Gianluca Tornese MD PhD Ass. prof., Universitetet i Trieste, Italien

Avhandlingen baseras på följande delarbeten

I. Wersäll JH., Adolfsson P., Forsander G., Ricksten SE., Hanas R. Delayed referral is common even when new-onset diabetes is suspected in children. A Swedish prospective observational study of diabetic ketoacidosis at onset of type 1 diabetes. Pediatr Diabetes. 2021; 22(6): 900-908

II. Wersäll JH., Adolfsson P., Forsander G., Hanas R. Insulin pump therapy is associated with higher rates of mild diabetic ketoacidosis compared to injection therapy: A 2-year Swedish national survey of children and adolescents with type 1 diabetes. Pediatr. Diabetes. 2022; 23:1038–1044

III. Wersäll JH, Ekelund J., Åkesson K. Hanas R., Adolfsson P., Ricksten SE., Forsander G. Relative poverty is associated with increased risk of diabetic ketoacidosis at onset of type 1 diabetes in children. A Swedish national population-based study from 2014 to 2019.

Submitted

IV. Wersäll JH, Ekelund J., Forsander G., Adolfsson P., Ricksten SE., Hanas R. Is diabetic ketoacidosis at onset of type 1 diabetes associated with recurrent episodes of ketoacidosis? A nationwide longitudinal study of Swedish children 2012–2019.

In manuscript

SAHLGRENSKA AKADEMIN
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Abstract

Background: Diabetic ketoacidosis (DKA) is a life-threatening acute complication of diabetes. Mortality is relatively rare in developed countries but high in developing parts of the world, and DKA might cause long-term cognitive impairment. Since DKA is preventable, it is important to investigate factors associated with increased risk of this condition.

Aim: The overall aims of this thesis were to investigate risk factors for DKA in children, regarding delayed referral and low household economic standard for new-onset T1D, and insulin delivery type, DKA at T1D and socioeconomic factors for children with established T1D.

Methods: Study I and II were prospective, national population-based studies in which data were collected through questionnaires. Study III and IV were register-based, retrospective national population studies in which data from the National Diabetes Register and from Sweden's public statistical agency were merged. For socioeconomic variables, the longitudinal integrated database for health insurance and labor market studies (LISA) provided by Statistics Sweden was used and study-specific variables derived from LISA. For the main exposure variable in study III, relative low economic standard as defined by the European Union's statistical agency and Statistics Sweden was used.

Conclusions: Delayed referral is common in children with new-onset T1D. CSII is associated with increased risk of mild DKA. Persistent low economic standard is associated with increased rates of DKA at new-onset T1D in children. There is no evidence that DKA at new-onset T1D is associated with a later episode of DKA. Parental level of education and low household disposable income are risk factors of DKA, both at onset of T1D and during established T1D.

Keywords: Diabetic ketoacidosis, type 1 diabetes, continuous subcutaneous insulin infusion, multiple daily injections, cerebral edema, socioeconomic status, low economic standard, level of education.

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