Severe stress-induced insulin resistance in an eight year old boy with T1DM, reversed after psychiatric treatment

Wilhelmina Children's Hospital

C.C.N. van Ommen[1,2], J.J.G. Hoorweg-Nijman[2], H. Stuart-de Vries[1,2], P.K.H. Deschamps[3], A.A. Verrijn Stuart[1,2]

[1]Pediatric Endocrinology, Department of Pediatrics, UMC Utrecht, Netherlands.
[2]Diabetes Centraal, Pediatric Diabetes Center Utrecht, Netherlands. [3]Department of Psychiatry, UMC Utrecht, Netherlands.

Background

Persistent severe insulin resistance (IR) in T1DM is infrequent, complex to handle and disabling. This case report discusses the potential role of habitual and stress-inducing environmental factors in a school-aged boy with a neurodevelopmental disorder and demonstrates that this severe IR can be reversed after psychiatric treatment and stress- reduction.

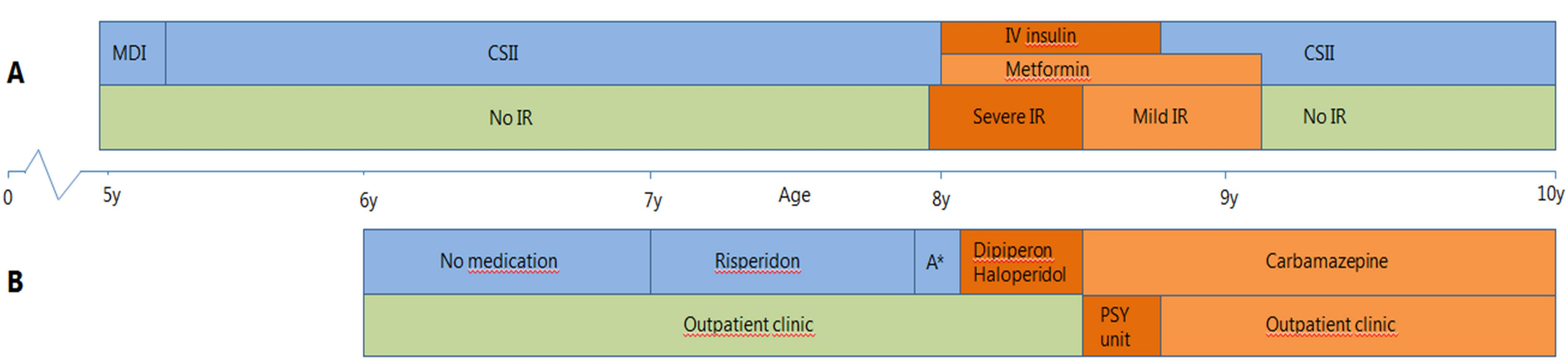
Case report

An eight year old boy with onset of T1DM at age five (GAD positive), was regulated by uneventful continuous subcutaneous insulin infusion (CSII) during three years, after a short episode of multiple day injections (MDI).

At age six, he was diagnosed with a neurodevelopmental disorder with symptoms of autism and deficient anxiety and attention regulation. Therapy consisted of behavioral interventions and atypical antipsychotics.

Shortly after starting aripiprazol, mild ketoacidosis developed. After appropriate treatment of ketoacidosis, recurrent severe hyperglycemia could only be managed by high dose intravenous insulin (iv) therapy up to 6 U/kg/day. Repeated attempts to reinitiate CSII were unsuccessful and addition of metformin also failed to reinstall glycemic control. Technical problems and pump manipulations were excluded; carbohydrate and exercise management did not affect IR.

Figure I.



A: Type 1 Diabetes Mellitus (T1DM). Top bar: insulin treatment; bottom bar insulin resistance

B: Psychiatric treatment. Top bar: medication; bottom bar: treatment setting A*: Aripiprazol

Case report (continued)

Extensive laboratory investigations revealed normal cortisol, catecholamine- and glucagon levels; positive anti-insulin and negative insulin receptor antibodies. Antipsychotics, as potential trigger for IR, were discontinued; thereafter behavioral problems deteriorated despite initiation of carbamazepine treatment. Five months after onset of IR, the boy was admitted to a child psychiatry inpatient unit. A 24/7 structured, behavioral approach combined with strict T1DM regulation led to improvement of IR and successful, lasting transfer to CSII treatment. Time course is depicted in Figure I.

Discussion

We hypothesize that stress has induced IR in this boy with T1DM and a neurodevelopmental disorder. Antipsychotic treatment alterations may have further triggered IR. However, cessation of antipsychotic treatment did not re-install glycemic control; suggestive of a role for stress-induced IR. With structured behavioral approach in a child psychiatry unit combined with strict regulation of nutrition and insulin therapy IR disappeared.

Conclusion

IR appeared to be at least in part stress dependent and an integrated therapeutic approach led to better behavioral- as well as glycemic control, reversing disabling high dose IV insulin therapy.