

important, and we thank Dr. Bell for his interest in our work.

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Type 1 Diabetes and Autism: Is there a link?

Response to Freeman et al.

In a recent issue of *Diabetes Care*, Freeman et al. (1) discussed a possible link between type 1 diabetes and autism spectrum disorder (ASD). Their data suggested that the prevalence of ASD in nearly 1,000 children with type 1 diabetes may be greater than that in the general population.

We investigated the presence of ASD in 5,178 children diagnosed with type 1 diabetes at age ≤ 14 years from the Prospective Childhood Diabetes Registry of Finland. Children with type 1 diabetes were born between 1980 and 2000. The data were linked to the nationwide Hospital Discharge Register (HDR) by the end of the year 2003 using the unique personal identity number that is assigned to all residents of Finland. We included autism, Asperger disorder, pervasive developmental disorder—not otherwise specified, Rett’s syndrome, and childhood disintegrative disorder in the diagnosis of ASD (2). We also linked the data of mothers of ASD cases to the HDR and reviewed hospital records in order to find out pregnancy and delivery complications related as potential risk factor for subsequent ASD in the child.

Seven cases with type 1 diabetes fulfilled the criteria of ASD, giving a cumulative incidence of 1.35/1,000 (95% CI 0.5–2.8). The cumulative incidence of ASD did not differ from that in the background population. The cumulative incidence of ASD was 1.39/1,000 (1.2–1.57) at age 18 years in northern Finland (3). There was male excess in ASD; five of seven cases were boys. Perinatal risk factors were present in five cases of ASD; some of them had several: asphyxia during delivery was present in two cases, umbilical cord around the neck in three cases, and excess bleeding during delivery in two cases, of which one had asphyxia and one had umbilical cord around neck.

Some studies have suggested that a family history of autoimmune disorders is more common among children with ASD than those healthy control children (4). However, there are many limitations in these studies, especially regarding sample sizes and study designs. A recent appro-

priately designed case-control study, much larger than those conducted earlier, found no overall association between ASD risk in children and autoimmune disorders in mothers; only psoriasis occurred more frequently (5).

Finland provides free or low-cost health service for all the habitants. Specialized health care like child neurological and psychiatric services are available in central hospitals and university hospitals that can all be found in the HDR. The HDR also covers central institutions for the mentally disabled. The HDR has nationwide coverage of inpatient treatment facilities. However, we were not able to capture cases who were diagnosed and treated as outpatient only; therefore, some mild cases of ASD may have remained unrecognized.

In conclusion, our observations do not support the suggestion about the link between type 1 diabetes and ASD. These findings, however, suggest that a subgroup of children developing autism suffered exposure to adverse prenatal and neonatal asphyxia (6) and unfavorable events in pregnancy, delivery, and the neonatal phase.

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