Dear Editor,

Type 1 diabetes mellitus (T1DM) is characterized by a chronic, progressive, and immune-mediated destruction of the insulin-producing beta-cells (β-cells) in the pancreatic islets of Langerhans. It may occur in association with other autoimmune diseases involving other endocrine tissues, such as thyroid and adrenal glands, or non-endocrine tissues, such as gastric and intestine mucosa. Heterotopias are malformations of cortical development characterized by the presence of normal brain cells in abnormal positions. They can be classified into three groups, based on their location: periventricular, subcortical, and leptomeningeal. Neurological manifestations have been described, including seizures, mental motor retardation, and neuropsychiatric disorders, including schizophrenia, depression, anxiety, and autism.

Various diseases that have been reported in association with T1DM include Rett syndrome, neurofibromatosis type 1, Crohn's disease, celiac disease, glutaric aciduria type 1, and spinal muscular atrophy. Here we report the case of a Turkish 8-year-old boy with T1DM and periventricular heterotopia.

An 8-year-old boy presented with partial onset of secondarily generalized seizures. On taking history, the patient was followed by T1DM for 2 years in another hospital. He was born in the 40th gestational week by normal delivery with 3300 g of birth weight to consanguineous parents (first cousins). At the age of 6 years, he was diagnosed to have T1DM when he had presented with ketoacidosis. His glycemic control had been optimal with regular insulin therapy. We learned that the patient had a seizure 2 months ago. The serum glucose level at the seizure was found to be 53 mg/dL and it was said that the patient’s seizure was thought to be due to hypoglycemia. On examination, vital signs, and the results of physical and neurological examination were found to be normal. The results of laboratory examinations (complete blood cell count, liver enzymes, kidney function parameters, serum electrolytes, and glucose rate) were normal. The patient was administered Levetiracetam (LEV) monotherapy. LEV had started and his seizures were ceased. Interictal electroencephalography showed epileptiform abnormalities in right temporal regions. Magnetic resonance imaging (MRI) of the brain revealed heterotopia in posterior horn of the right lateral ventricle. Stanford–Binet test was performed and mild intellectual disability was detected.

Seizure or epilepsy is observed in patients with T1DM. Metabolic abnormalities of diabetes mellitus such as hyperglycemia and hypoglycemia could have a damaging effect on the central nervous system, which may cause seizure; indeed, in endocrine disorders, seizures could be the result of neuroinflammation, autoimmunity, or metabolic disturbances. Focal epilepsy may be the first symptom of diabetes mellitus in some patients, and can lead to the discovery of diabetes mellitus. Some studies also described several transient changes in MRI following seizures. These brain parenchymal changes are typically hyperintense on T2-weighted and fluid-attenuated inversion recovery images. Nevertheless, some patients without evidence of brain damage have been reported. In sum, during hyperglycemia, a focal reduction in blood flow may occur with consequent focal seizures; however, there is no constant relationship between blood glucose levels and the frequency or severity of neurological symptoms. Also, focal seizures can be symptomatic of structural lesions within the brain. Our patient had diabetes and also periventricular heterotopy. Even if there is T1DM in the focal seizure, should come to mind in structural anomalies of central nervous system.

In conclusion, we found a structural abnormality in a diabetic patient with focal seizure. Epilepsy can be a feature of diabetic patients. However, seizures should not be considered to be due solely to metabolic disorders of diabetes. In the presence of seizure, diabetic patients need a multidisciplinary approach that involves pediatric endocrinologists and neurologists to optimize therapeutic management and follow-up.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

Faruk Incecik¹, Fatih Gürbüz²
Departments of ¹Pediatric Neurology and ²Pediatric Endocrinology, Faculty of Medicine, Çukurova University, Adana, Turkey
Figure 1: Magnetic resonance imaging of the brain showing heterotopia in the right lateral ventricle

Address for correspondence: Dr. Faruk İnceçek, Department of Pediatric Neurology, Faculty of Medicine, Cukurova University, Toros mah. 78186 sok. Yeşilpark Evleri, Kat: 7, No: 13, Adana, Turkey, E-mail: fincecik@yahoo.com

REFERENCES

1. Tsirogianni A, Pipi E, Soufleros K. Specificity of islet cell autoantibodies and coexistence with other organ specific autoantibodies in type 1 diabetes mellitus. Autoimmun Rev 2009;8:687-91.

2. Dubeau F, Tampieri D, Lee N, Andermann E, Carpenter S, Leblanc R, et al. Periventricular and subcortical nodular heterotopia: a study of 33 patients. Brain 1995;118:1273-87.

3. Çetin D, Ünüböl M, Güney E, Karaöglu AO, Meteöglu I, Bozkurt G. Coexistence of type 1 diabetes mellitus and Crohn’s disease. Turk J Gastroenterol 2013;24:451-2.

4. Borkowska A, Jankowska A, Szlagatys-Sidorkiewicz A, Sztangierska B, Liberek A, Plata-Nazar K, et al. Coexistence of type 1 diabetes mellitus and spinocerebellar atrophy in an 8-year-old girl: a case report. Acta Biochim Pol 2015;62:167-8.

5. Kamoun M, Charfi N, Rekik N, Mnif MF, Mnif F, Kmiha H, et al. Neurofibromatosis and type 1 diabetes mellitus: an unusual association. Diabet Med 2009;26:1180-1.

6. Rekik NM, Kamoun M, Mnif F, Charfi N, Mnif MF, Abid M. Type 1 diabetes mellitus and Rett syndrome: is there a link? J Endocrinol Invest 2010;33:851.

7. Verrotti A, Scaparrotta A, Olivieri C, Chiarelli F. Seizures and type 1 diabetes mellitus: current state of knowledge. Eur J Endocrinol 2012;167:749-58.

8. Mukherjee V, Mukherjee A, Mukherjee A, Halder A. Type 1 diabetes mellitus in a child presenting with epilepsy partialis continua. J Indian Med Assoc 2007;105:340-342.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Received: 16-10-18, Revised: 18-11-19, Accepted: 18-11-19, Published: 18-03-20.