Possible Associations of Acut Hepatitis B With New-onset Type 1 Diabetes: A Case Report

Yeni başlangıçlı Tip 1 Diyabet ile Akut Hepatit B Muhtemel İlişkisi: Olgu Sunumu

Nesibe Akyürek[1], Mehmet Emre Atabek[2], Beray Selver Eklioglu[2]

[1] Department of Pediatric Endocrinology and Diabetes, Konya Training and Research Hospital , Konya, Turkey
[2] Department of Pediatric Endocrinology and Diabetes, School of Medicine, Necmettin Erbakan University, Konya, Turkey

ABSTRACT

Type 1 diabetes (T1D) results from the destruction of pancreatic beta cells, and genetic and environmental factors are believed to be the major components in the development of the disease. Viruses have long been suspected to contribute to the onset of T1D. Hepatitis B (HBV) is associated with the development of autoimmunity. We describe a case of type 1 diabetes that was triggered by HBV.

Key Words: Type 1 diabetes mellitus, acut hepatitis B, child

ÖZET

Tip 1 diyabet gelişiminde esas faktör pankreasın beta hücrelerinin genetik ve çevresel nedenlerle tahribatıdır. Virüslerin tip 1 diyabetin tetiklenmesinde rol oynadığı bilinmektedir. Hepatit B virusu otoimmünite ile ilişkilidir. Bu yazıda Hepatit B virusünün tetiklediği tip 1 diyabet'li bir vaka sunulmuştur.

Anahtar Sözcükler: Tip 1 diabetes mellitus,akut hepatit,çocuk

INTRODUCTION

Type 1 diabetes (T1D) is a multistage, T cell-mediated autoimmune disease that involves the slow and progressive destruction of islet b cells, resulting in a complete loss of insulin secretion (1). How T1D is triggered is not yet known, but evidence from humans and animal models implicates environmental factors in the mechanism of disease initiation (2,3). HBV is one of the viruses for which there is significant data on the relationship with loss of tolerance. HBV is strongly associated with the development of autoimmunity. We describe a case of T1D with non-fulminant acute hepatitis.

We report this case here because we considered that T1D was triggered by hepatitis B.

CASE REPORT

A 12-year-old girl was admitted to the hospital with complaints of polyuria, polydipsia, decreased appetite, and weight loss of 8 kg over a few weeks. She was born at term by normal vaginal delivery (birth weight 3200 g) from a healthy mother as the first child in the family. There was no consanguinity between the parents. No family history of diabetes was reported. Physical examination at the time of admission showed a temperature of 36.2 C, a pulse of 99 beats per minute, a respiratory rate of 22 per minute, and a blood pressure of 90/60 mm/Hg. The patient's height was 138 cm (-2.05 SDS) and her weight was 35 kg (-1.1 SDS). Calculated body mass index was 18.3 kg/m2 (0,04SDS).

Address for Correspondence / Yazışma Adresi: Nesibe Akyurek, MD Konya Eğitim Araştırma Hastanesi Cocuk Sagligi ve Hastaliklari, Konya, Turkey Tel: 00. 90. 332. 323 6709 Fax: 00. 90. 332.3236723 E-mail: n_akyurek@yahoo.com.tr

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Her skin had normal moisturization, and did not have petechia or other eruptions. Her jugular venous pressure was normal. Her lungs were clear in auscultation. Her cardiac examination was normal.

The liver was palpable two finger-breadths in the right hypochondrium, but it was smooth and non-tender. There was no splenomegaly, and no fluctuation was recognized. Blood gas analysis showed a pH of 6.7 and HCO_3 2.8 mmol/L. The diagnosis of diabetic ketoacidosis was made, and after appropriate fluid-electrolyte and insulin therapy, multiple doses (4 times daily) of insulin injection treatment (1 U/kg/day) was started. Laboratory findings were as follows; hemoglobin 11.9 mg/dL (normal range: 9.6-13.5 mg/ dL); white blood cell count (WBC) 11,000 / mm^3 (normal range: 5000-11,800/mm^3); platelet count 265,000/mm^3 (normal range: 150,000-350,000/mm^3); blood glucose 93 mg/dL (normal range: 60-110 mg/ dL); total bilirubin 1.2 mg/ dL (normal range: 0-2 mg/ dL); direct bilirubin 0.1 mg/dL (normal range: 0-0.2 mg/ dL); aspartate aminotransferase (AST) 420 IU/L (normal range: 0-47 IU/L); alanine aminotransferase (ALT) 775 IU/L (normal range: 0-39 IU/L); gamma glutamyl transpeptidase (GGT) 19 IU/L (normal range: 0-23 IU/L); protrombin time (PT) 12.4 second (normal range: 10-15 second). Renal function tests were normal. No increase in ammonia was observed. Glycosylated haemoglobin A1c was 14. Pancreatic autoantibodies [Islet cell autoantibodies (ICA), glutamic acid decarboxylase antibodies (antiGAD) and anti-insulin autoantibodies (AIA)] were positive. Two weeks before hospitalization she developed general fatigue and nausea. There was nothing remarkable in her medical or family history, and there was no record of transfusion. The patient did not exhibit autoantibodies, including antinuclear antibodies and antineutrophilic cytoplasmic antibodies. The findings of serological tests for herpes simplex virus, Epstein-Barr virus, cytomegalovirus, HCV, HAV, and HEV were negative. As for HBV, the HB surface (HBs) antigen and IgM-HB core (HBc) antibody were positive. The HBs antibodies at low titer showed a gradual rising trend. Her father was diagnosed as HBV carrier at family screening. The patient was diagnosed as T1DM and acute hepatitis B. No other medical treatments besides daily insulin injections were administrated. On the 15th day of hospitalization, she recovered and left the hospital. Her liver function was normalized before discharge.

DISCUSSION

Type 1 diabetes results from the destruction of pancreatic beta cells, and genetic and environmental factors are believed to be the major components in the development of the disease. Viruses have long been suspected to contribute to the onset of T1D in at least two distinct ways. Virus may trigger beta cell-specific autoimmunity leading to diabetes, or may directly infect and destroy insulin-producing pancreatic beta cells, resulting in clinical T1D (4).

Hepatitis B virus is associated with liver disease, but is also linked to extra-hepatic manifestations, such as prodromal serum sickness in acute hepatitis, membranous glomerulonephritis, membranoproliferative glomerulonephritis, cutaneous vasculitis, infantile popular acrodermatitis, essential mixed cryoglobulinaemia, and polyarteritis nodosa, all forms of immune complex diseases. Furthermore, an association of HBV infection with other inflammatory syndromes has been suggested in diseases such as rheumatoid arthritis, polymyalgia rheumatica, and polymyositis (5-7). Also HBV has been found to be associated with an increased incidence of thyroid autoimmunity , autoimmune hepatitis ,and T1D (4,8,9).

These extra-hepatic manifestations could be the result of the mechanisms leading to autoimmune phenomena, and thus support the hypothesis that HBV is strongly associated with the development of autoimmunity. Several mechanisms have been linked to HBV as the inducer of some autoimmune phenomena. These are: molecular mimicry between HBV antigens and self proteins, the generation of immune complexes between HBV antigens and antibodies, and apoptosis/tissue damage resulting in the exposure of intracellular antigens (10-15).

Khuri et al. aimed to assess the relationship between hepatitis B virus markers and diabetes mellitus (16). Compared with a control population, the diabetic subjects showed a significantly higher prevalence of HBV markers. Despite these results, this study could not determine whether the onset of diabetes preceded the HBV infection or vice versa. Halota et al. demonstrated the serum presence of HBcAb in 123 of 315 patients suffering from T1D, and they suggested that patients suffering from T1D incur a high risk of infection with hepatotropic viruses because of frequent hospitalizations and blood tests (17).

Our patient had a new onset diabetes, her medical history and family history were normal, and there was no record of transfusion. Despite the insufficient data in the literature, HBV could be one of the triggers for T1D. A large-scale study should be done to further clarify the relationship between the pathogenesis of T1DM and the hepatitis B infection.

Conflict of Interest

No conflict of interest was declared by the authors.

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