SHORT COMMUNICATION

Investigation of interleukin-6 in hepatitis B patients with high blood glucose levels

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Received 15 March 2012; accepted 6 April 2012
Available online 15 May 2012

Abstract  Hepatitis B virus plays an important role in persistent inflammation with necrosis of the liver tissue, with the result that some patients with hepatitis develop diabetes. The present study aims to understand the correlation between pro-inflammatory interleukin-6 (IL-6) expression and insulin resistance in hepatitis B patients. Forty-three patients with diabetes, 68 patients with hepatitis, and 68 controls without hepatitis and diabetes were included in this study. The concentrations of glycated hemoglobin, glucose, and insulin antibodies in patients with hepatitis B were significantly higher than those in controls without hepatitis and diabetes ($p < 0.001$). The IL-6 concentrations in the patients with hepatitis B were significantly higher than those in the group with diabetes and the control group. The results suggest that an increase in IL-6 level in hepatitis B patients may lead to the occurrence of high blood glucose levels.

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doi:10.1016/j.gmbhs.2012.04.014
Introduction

Hepatitis B is the major cause of liver disease in adults over the age of 40 years in Taiwan. The literature indicates that hepatitis B virus plays an important role in persistent inflammation with necrosis of the liver tissue, with the result that some patients with hepatitis develop a liver-derived diabetes. Several studies have reported that the activities of pro-inflammatory hormones such as tumor necrosis alpha and interleukin-6 (IL-6) are correlated with the presence of insulin resistance, which is the important feature of type 2 diabetes. In order to understand the correlation between proinflammatory IL-6 expression and insulin resistance in hepatitis B patients, groups of patients with hepatitis B and with diabetes were included in this study. Hopefully, the results of the present study will provide a reference for medical personnel to apply follow-up medical services for patients with hepatitis B.

Materials and methods

Blood samples were collected from 43 patients with diabetes, 68 patients with hepatitis B, and 68 randomized controlled patients without diabetes and hepatitis, whose medical histories were confirmed by the gastroenterologist and endocrinologist and signed letters of informed consent. Analysis of the concentrations of glucose, glycated hemoglobin (HbA1c), insulin antibodies, and IL-6 were performed using automated equipment, the Roche Cobas C501, Perkin Elmer 1470, and Thermo Scientific Multiskan Spectrum (Thermo Fisher Scientific Inc. Bohemia, NY, USA), respectively, according to the manufacturers’ protocols. The values for each test were analyzed by Student t test to compare the results and determine the difference of degree between them.

Results

The concentrations of HbA1c, glucose, and insulin antibodies in 68 patients with hepatitis B (6.5 ± 1.6%, 103 ± 39 mg/dL, and 6.43 ± 1.2%, respectively) and 43 patients with diabetes (7.0 ± 1.1%, 122 ± 32 mg/dL, and 6.39 ± 1.3%, respectively) were higher than those of randomized controlled patients without hepatitis and diabetes (5.6 ± 0.3%, 88 ± 19 mg/dL, and 5.73 ± 0.54%, respectively), the difference being highly significant ($p < 0.001; \text{Fig. 1}$). In line with these findings, IL-6 concentrations in the patients with hepatitis B (0.0077 ± 0.0149 ng/mL) and with diabetes (0.0012 ± 0.0076 ng/mL) were also higher than that in the control group (0.0006 ± 0.0042 ng/mL), a significant difference being...
seen only between the patients with hepatitis and the control group ($p < 0.05$; Fig. 2).

**Discussion and conclusion**

The reason for hepatitis patients developing high blood glucose levels is not well understood. In the present study, blood glucose, IL-6, and insulin antibodies were shown to increase in hepatitis B patients, which suggested that infection with hepatitis B virus is also an important cause of high blood glucose. Therefore, further studies of gene expression are needed to investigate whether the above biomarkers could be used in hepatitis B patients as predictors of the occurrence of high blood glucose levels, optimal medical services then being targeted toward this group.

**Acknowledgments**

Thanks go to the medical fund of the Public in Medical Unit, Armed Force Taichung General Hospital for providing full funding for the research.

**References**