EDITORIAL
Korean J Intern Med 2012;27:273-274
http://dx.doi.org/10.3904/kjim.2012.27.3.273

pISSN 1226-3303 eISSN 2005-6648
http://www.kjim.or.kr

Low Hemoglobin Concentration Is Associated with Several Diabetic Profiles

Eunjin Kwon and Chulwoo Ahn

Department of Endocrinology, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

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Anemia is relatively common in patients with diabetes mellitus, and low hemoglobin concentration contributes to many clinical aspects of diabetes mellitus or its progression. Low hemoglobin concentration in patients with diabetes mellitus is associated with a more rapid decline in glomerular filtration rate than that of other kidney diseases [1]. Diabetic nephropathy and diabetic retinopathy result in increased susceptibility to low hemoglobin level [2].

A previous observational study demonstrated that low hemoglobin level is associated with increased cardiovascular mortality and chronic kidney disease (CKD) in patients with diabetes mellitus [3]. Some studies suggest that β-cell dysfunction occurs due to hypoxic damage to the pancreatic islet cells [4,5], which leads to a progression to diabetes.

The present study aimed to demonstrate an association between low hemoglobin concentration and several metabolic factors, β-cell dysfunction, and microangiopathies in Korean patients with diabetes. The results showed that patients with lower hemoglobin concentrations were associated with a lower prevalence of current smoking, longer duration of diabetes, lower body mass index, and lower concentrations of total cholesterol, triglycerides, and low density lipoprotein-cholesterol. Such patients showed a lower concentration of postprandial c-peptide and lower postprandial β-cell responsiveness. These patients also had a higher prevalence of retinopathy and nephropathy.

Diabetes mellitus is a progressive disease that leads to CKD and cardiovascular mortality [6,7]; thus, it is as important to prevent vascular complications as it is to control the disease itself. Therefore many parameters have been developed to predict such a progression.

Hemoglobin concentration is closely associated with diabetic profiles. Anemia in patients with diabetes increases susceptibility of the kidney to nephropathy, although the precise mechanism remains unknown. It is widely accepted that patients with diabetes are more vulnerable to the effects of anemia [8]. Al-Khoury et al. [9] demonstrated that for each CKD stage, hemoglobin is 1 g/dL lower in patients with diabetes than in the non-diabetic population.

Diabetes mellitus is one of the leading causes of cardiovascular mortality and morbidity, and low hemoglobin concentrations contribute to developing cardiovascular disease in patients with diabetes [10].

Diabetic progression can be explained by β-cell dysfunction, which results from hypoxic damage to pancreatic islet cells [4,5]. We provide consistent results showing that low hemoglobin concentration was associated with low postprandial c-peptide concentration and low β-cell re-

Received: August 23, 2012
Accepted: August 26, 2012

Correspondence to Chulwoo Ahn, M.D.
Department of Endocrinology, Gangnam Severance Hospital, Yonsei University College of Medicine, 211 Eonju-ro, Gangnam-gu, Seoul 135-720, Korea
Tel: 82-2-2019-3339, Fax: 82-2-3463-3882, E-mail: ACW@yuhs.ac

sponsiveness.

Low hemoglobin concentration has strong associations with the diabetic profiles mentioned above, but has no demonstrated mechanisms to explain such correlations. Thus, physicians should be aware of the potential effect of anemia on the diabetic population.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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