

A Case with Abnormally High HbA1c Level

Ferhat Ekinci^{*a}, Bilge Tuncel^b, Demet Merder Coşkun^b

^a Directorate of Public Health, Van, Turkey

^b Marmara University, Faculty of Medicine, Department of Family Medicine, Turkey

ARTICLE INFO

Article Type:

Case Report

Article History:

Received: 2015-05-23

Revised: 2015-10-11

Accepted: 2016-02-31

ePublished: 2016-04-25

Keywords:

Hemoglobin A1c protein

Human

Diabetes mellitus

Fetal hemoglobin

ABSTRACT

HbA1c is a marker that is used to monitor long-term glycemic control and risk of complications in diabetic patients. HbA1c measurement is based on the life span of red blood cells. Variants of hemoglobin may cause errors in HbA1c measurements because they may shorten the life span of red blood cells potentially causing low measurement levels. However, depending on the method of measurement, high measurement levels can be obtained. This condition can cause nondiabetic patients to be diagnosed as diabetic or can cause drug changes and hypoglycemic comas in diabetic patients. In order to prevent wrong diagnosis and treatment of such cases, laboratory techniques should include those which are unaffected by asymptomatic high or low levels of hemoglobin such as IFCC RM or fructosamine measurement.

*Corresponding author: Ferhat Ekinci, E-mail: drfekinci@gmail.com

Introduction

High levels of HbF in adulthood cause incorrect measurements in HbA1c levels. HbF shortens the lifespans of red blood cells; however, faulty measurements may also measure HbF as HbA1c, leading to an incorrect result of high HbA1c level. HbF level is 60%–95% at birth, and it reaches adult levels during the first year since birth. Upper limit is 1% in adults but it may be up to 30% in patients with diseases, such as leukemia, anemia, thalassemia, and hereditary persistent HbF^[1,2].

Case Report

A 33-year-old female patient visited our outpatient clinic complaining of dry mouth and weakness for 2 months. Her blood pressure was 100/60 mmHg, pulse was 70/min, and findings of physical examination were normal. Her laboratory results were WBC, 5300 cells/uL; Hb, 10.7 g/dL; platelet count, 218,000; Hct, 33%; MCV, 67.3 fL; AST, 15 u/L; ALT, 13 u/L; BUN, 16mg/dL; creatinine, 0.9 mg/dL; ferritin, 13 ng/mL; fasting blood glucose, 84 mg/dL; satiated blood glucose, 130 mg/dL; HbA1c, 18%; and ESR, 6 mm/h. She did not have a family history of diabetes, and both fasting and satiated blood glucose were normal. We believed that our laboratory made mistakes while measuring HbA1c; therefore, hemoglobin electrophoresis was performed. The results were as follows: HbA, 86%; HbF, 11.15%; and HbA1c, 3.36%. The patient was referred to the endocrinology and hematology departments as she was believed to have persistent high levels of HbF. On further investigation, she was found to have adenoid vegetation and snoring. Dry mouth and weakness complaints were believed to be due to snoring. She then underwent operation by the otorhinolaryngology department, after which her complaints reduced.

Discussion

HbA1c which is the monitoring criterion for diabetes mellitus may be incorrectly measured as high in hemoglobinopathies; this may cause incorrect diagnosis and treatment. In order to avoid such incorrect diagnosis and treatment of cases, laboratory techniques should include those that are unaffected by asymptomatic high or low levels of hemoglobin, such as IFCC RM or fructosamine measurement.

References

- [1] Ijima H, Jinnouchi H, Hamaguchi K, Ohguni S, Haga Y, Nagashima M, Miyazaki A, Koga M. Cases with Hb Toranomom show abnormal HbA1c levels measured by upgraded high-performance liquid chromatography models. *Diabetology International*. 2011;1:202-7.
- [2] Ogawa K, Bando T, Ogawa M, Miyazaki A, Nakanishi T, Shimizu A. [A variant hemoglobin found by dissociation of blood glucose from HbA1c on routine physical examination]. *Rinsho byori. The Japanese journal of clinical pathology*. 2003 ;51:508-15.