Extraordinarily Low Level of HbA1c due to Hemolytic Anemia

Hemolitik Anemi Nedeniyle Oluşan Çok Düşük HbA1c Düzeyi

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ABSTRACT

HbA1c measurement gives us information about glycemic levels in patients with diabetes mellitus for the last 3 months. Some factors such as drugs, anemia (hemolytic anemia, hemoglobinopathies etc.), alcoholism, renal failure may affect HbA1c levels via decreasing erythrocyte survival. Herein, we report a very rare clinical presentation of a case of geriatric male patient with an extraordinarily low level of HbA1c (2.7%) which was caused by immune hemolytic anemia associated with chronic lymphocytic leukemia.

Key Words: Low level of HbA1c, hemolytic anemia, chronic lymphocytic leukemia

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ÖZET

HbA1c ölçümü diyabetik hastalarda son 3 ay içerisindeki kan glukoz düzeyleri hakkında bize fikir vermektedir. İlaçlar, anemi (hemolitik anemi, hemoglobinopatiler vs.), alkolizm ve böbrek yetmezliği gibi bazı durumlar eritrosit yaşam süresini kısaltarak HbA1c düzeylerini etkileyebilmektedir. Burada, çok nadir görülen bir olguyu, kronik lenfositik lösemi ile ilişkili immün hemolitik anemi nedeniyle meydana gelen çok düşük HbA1c düzeyi görülen (%2,7) yaşlı bir erkek hastayı sunuyoruz.

Anahtar Sözcükler: Düşük HbA1c düzeyi, hemolitik anemi, kronik lenfositik lösemi

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INTRODUCTION

Glycosylated hemoglobin consist with progressive, irreversible and non-enzymatic glycosylation of the HbAo-β chain (1). Thus glycosylation reaction occurs during the life span of erythrocytes depending on the blood glucose concentration and erythrocyte glucose exposure time. HbA1c (Glycohemoglobin) measurement gives us information about the last 3 months of glycemic levels in relation to erythrocyte survival (120 days).

Some factors such as drugs, anemia (hemolytic anemia, blood loss, sickle cell anemia, hemoglobinopathies, etc.), alcoholism, and chronic renal disease may affect HbA1c levels via decreasing erythrocyte survival (2-4).

Herein, we report a case of 80 year-old male with extraordinary low level of HbA1c causing by immune hemolytic anemia associated with chronic lymphocytic leukemia (CLL).

CASE REPORT

A 80 year-old male patient was admitted to our geriatric outpatient clinic due to the progressively worsening general weakness and fatigue in the last three months. The medical history of the patient consists of benign prostate hyperplasia, atrial fibrillation, essential tremor, and early stage CLL without treatment for 2 years. There was no history of alcoholism, renal failure, grossly blood loss anywhere. The physical examination at the admission was normal except pale conjunctiva. Patient was afebrile, normotensive, and with no signs of organomegaly.

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Laboratory tests revealed that red blood cell count was 2.234 $x10^{12}$/L (normal range: 4-5.2 $x10^{12}$/L), hemoglobin 8.38 g/dL (normal range: 14-18 g/dL), white blood cell 29.63 $x10^3$/µL (normal range: 4.5 – 11 $x10^3$/µL), lymphocyte 20.82 $x10^3$/µL (normal range: 0.9 – 5.2 $x10^3$/µL), erythrocyte sedimentation rate 77 mm/hr (normal range: 0-15 mm/hr), folic acid 3.09 ng/mL (normal range: 4.6-34.8 ng/mL), total bilirubin 2.84 mg/dL (normal range: 0.2-1.1 mg/dL), direct bilirubin 0.62 mg/dL (normal range: 0-0.5 mg/dL), aspartate aminotransferase 58 U/L (normal range: 0-40 U/L), fasting blood glucose 105 mg/dl (FBG) (normal range: 70-100 mg/dl). Renal function tests were in normal range.

As he had impaired fasting glucose and diabetic symptoms such as xerostomia, polyuria, polydipsia and pollakiuria, FBG was repeated and found 93 mg/dL (normal range: 70-100 mg/dl), and HbA1c was performed and found 2.7% (normal range: 3.9-6%). He did not suffer from symptoms due to hypoglycemia or had any documented hypoglycemia attack before. Anisocytosis, polychromasia and 65% atypical lymphocyte predominance were seen in peripheral blood smear.

According to these findings, hemolytic anemia was suspected and to diagnose it hemolytic parameters were evaluated. Lactate dehydrogenase was 567 IU/L (normal range: 0-248 IU/L), reticulocytes count 178.23×10^9/L (normal range: $22\text{-}139\times10^9$/L), percentage of reticulocyte 7.5% (normal range: 0.5-2.5%), haptoglobin <29 mg/dL (normal range: 30-200 mg/dL), and direct coombs Ig G was quite positive.

In light of these findings, diagnosis of immune hemolytic anemia due to CLL was done and the patient was referred to the hematology department. After that, an oral corticosteroid (0.8 mg/kg/day methyl prednisolone) therapy was initiated.

DISCUSSION

HbA1c measurement is commonly used in the diagnosis and follow-up of patients with diabetes mellitus. Available data indicates that hemoglobin glycosylation occurs slowly and continues throughout the 120-day life span of erythrocytes (5). Independently of the measurement method, HbA1c level may decrease in cases with a shortened life span of erythrocytes. Causes of rapid turnover of red cells such as hemolysis or anemia treated with iron, vitamin B12 and folate deficiency, and patients treated with erythropoietin lead to falsely low HbA1c values because of a greater rate of young red cells (6). Also, the presence of hemoglobin variants may cause interference in HbA1c results (2).

To the best of our knowledge, the lowest levels of HbA1c ever reported in Medline are 1.4% and 2.27% (7; 8) due to immune hemolytic anemia. In our case, the patient had a complaint of some anemic and diabetic symptoms. We knew that the patient had a CLL history. But, to rule out diabetes mellitus, FBG and HbA1c levels were measured. The level of HbA1c was extraordinarily low with 2.7%. Also, he had anemia and an increased level of indirect bilirubin. We thought he had hemolytic anemia according to these findings and we found evidence showing immune hemolytic anemia in his laboratory tests indicated by increased levels of reticulocyte, quite positivity of direct coombs, and a decreased level of haptoglobulin.

CONCLUSION

The clinician should be aware of the meaning of a low level of HbA1c in patients with diabetes mellitus or who are suspected of having diabetes mellitus to detect the common problems such as hemolysis.

Conflict of interest

No conflict of interest was declared by the authors

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