

Establishment of Standard Operating Procedures for unexpectedly undetectable HbA1C in Diabetes Patient

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Background & Objective

Glycated hemoglobin is a crucial indicator for diagnosis of diabetes and monitor of blood glucose level over a period. A change of red blood cell lifespan or a variant of hemoglobin has negative impact on glycated hemoglobin analysis. Thus, reviewing reports carefully and management of test results are necessary for laboratory to offer accurate test values and clinical decision-making.

Case report

A 62-year-old woman consulted doctor for hypertension on October 30, 2019. The physician requested tests that the fasting blood glucose was 127 mg/dl (slightly higher than normal) and the glycated hemoglobin (Arkary HA-8180V, HPLC) was undetectable. With reviewing her past laboratory data, her laboratory data showed that fasting blood glucose was 121 mg/dl in January 2012, Mean corpuscular volume (MCV) was 60.5 fl. Importantly, the test methodology was suspiciously interfered with an existence of hemoglobin variants.

Standard Methods & Process

To report accurate test results, we established 3 solutions as interferences failed methodology (1) analyzing sample with alternative methodology, (2) performing glycated albumin test, and (3) being confirmed with hemoglobin electrophoresis.

Results

(1) Using the second method (PockChem A1c, Boronate Fluorescent Quenching (BFQ) Technology): low value (cannot be detected); (2) glycated albumin (GA) was 16% (biological reference interval: 11-16%); (3) Hemoglobin electrophoresis results was HbA: 3.7% (95.1-98%); HbF: 5.3% (0-1.5%); HbE / A2: 91%, diagnosed as HbE/Beta variant. Results provided the visiting doctor an accurate clinical decision-making.

Conclusion

This is a case of HbE/β variant. The incidence of HbE gene mutations is most common in Southeast Asia and Sri Lanka. The population structure and genes have changed due to rapid increase in a large immigrant population to Taiwan. When the laboratory found abnormal testing values, it is necessary to perform analysis with alternative methodology and contact with clinical physicians to provide accurate report for treatment.

【Relevance to HPH】

As a community hospital, an establishment of complete clinical testing strategy model provides people in Keelung area a more accurate and efficient testing platform and improve patient safety.

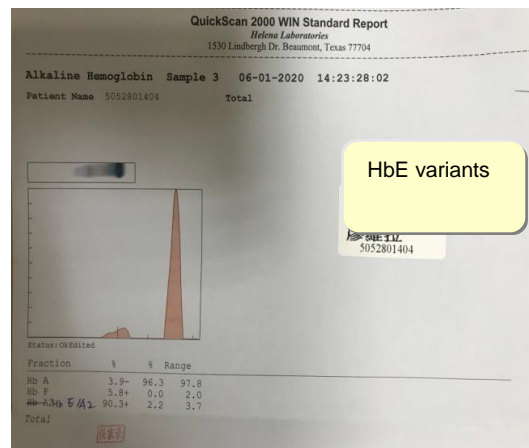


Table 1 The Frequency of HbE in various country

Country	India	Myanmar	Thailand	Cambodia	Lao Peoples Democratic Republic	VietNam	Malaysia	Indonesia
Carrier Frequency%	6~51	5-30	4-53	12-80	7-48	0-70	3-40	1-11

Source by Bulletin the world Health Organization, 2011.79(8)