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ORIGINAL ARTICLES

Measurement of Glycated Hemoglobin A1c from Dried Blood by Turbidimetric Immunoassay

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Abstract

Background:

Glycated hemoglobin A1c (A1C) is an important marker in the diagnosis and treatment of diabetes. Dried blood measurement of A1C is useful in large scale epidemiological evaluation of A1C, especially to assess the impact of intervention programs. The possibility of using dried blood for measurement of A1C by the immunoturbidimetric method was explored in the present study.

Method:

Blood was collected from 30 patients, and blood spots were prepared and dried. The dried blood spot samples were kept for different lengths of time at 4 °C to assess stability. Glycated hemoglobin was measured in whole blood and dried blood on the day of collection as well as on days 10 and 15 by immunoturbidimetric method.

Results:

The A1C values of 30 samples analyzed for comparison between whole blood estimation and dried blood ranged from 4.6% to 9.9%. The mean A1C on the day of sample collection was 6.01% ± 1.58% in fresh whole blood samples and 5.94% ± 1.58 % in dried blood spots. A linear and highly correlated relationship was observed between dried blood A1C values and those in whole blood (r = 0.986 and intraclass correlation value = 0.993). Glycated hemoglobin values on day 10 and day 15 were comparable with the values on day 1 with a shift in mean of just 1% on day 10 and 3.04% on day 15.

Conclusion:

In conclusion, dried blood can be used for measurement of A1C by immunoturbidimetric method, and further stability of A1C measurement from dried blood for up to 15 days at 4 °C makes it an ideal matrix for transportation in developing countries like India.

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Abbreviations: (A1C) glycated hemoglobin A1c, (EDTA) ethylenediaminetetraacetic acid, (HPLC) high-pressure liquid chromatography, (IgG) immunoglobulin G

Keywords: dried blood, glycated hemoglobin, immunoturbidimetric assay, stability

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