

Capsule Commentary on Radin, Pitfalls in Hemoglobin A1c Measurement: When Results May Be Misleading

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The measurement of hemoglobin A1c (A1c) is the most common method used to determine glycemic control and is an important predictor of microvascular complications in patients with both type 1 and type 2 diabetes.^{1,2} Additionally, in 2010, the measurement of A1c was added as a criteria for the diagnosis of diabetes (A1c levels \geq 6.5 % indicate diabetes).³ Because of the importance of this laboratory test in both the diagnosis and management of patients with diabetes, it is essential that health care providers recognize the factors that can lead to inaccurate and misleading results. In this issue, Radin discusses in detail the potential pitfalls of A1c measurements and also provides guidance on how the clinician can use alternative tests to determine glycemic control.⁴ The level of A1c is dependent on both the concentration of plasma glucose and the duration of exposure of hemoglobin to glucose.⁵ Thus, one major artifact of A1c measurements is changes in the half-life of red blood cells (RBC). Disorders that lead to an increased percentage of older RBCs, such as iron deficiency anemia, B12 or folate deficiency, or asplenia, artifactually elevate A1c levels. Conversely, disorders that shorten RBC life span, such as hemolytic anemia, blood loss, and splenomegaly, artifactually lower A1c levels. Patients with end-stage renal disease typically have falsely low A1c levels, due to a decrease in RBC lifespan. Similarly, during pregnancy, RBC lifespan is decreased leading to decreased A1c levels. Finally, hemoglobin variants can result in artifactually increased or decreased A1c levels, depending on the specific variant and the method

used to measure A1c levels. In the article by Radin, more complete information on the variety of factors that can alter A1c measurements is provided. It is important to recognize that there are other methods for determining glycemic control, including measuring fructosamine, glycated albumin, 1,5-anhydroglucitol, and continuous glucose monitoring. In patients with disorders that affect A1c measurements, these alternative tests are useful for determining glycemic control. Additionally, these alternative tests are very helpful when home blood glucose measurements and A1c levels are discordant.

Conflict of Interest: The author declares that he does not have a conflict of interest.

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