Glycated Albumin Is a Better Glycemic Indicator than Glycated Hemoglobin Values in Hemodialysis Patients with Diabetes: Effect of Anemia and Erythropoietin Injection

Reference:

Scientific Literature Review

Reviewed by: Melissa Q. Adams, DPM
Residency Program: Inova Fairfax Hospital Podiatric Surgical Residency Program

Podiatric Relevance:
Serum glycated hemoglobin (HbA1c) is the most frequently used measurements to evaluate glycemic control of diabetic patients. However, diabetic patients on hemodialysis (HD) may actually demonstrate a falsely low HbA1c level. This article recommends the use of serum glycated albumin (GA) rather than HbA1c for more accurate glycemic control monitoring in HD patients with diabetes.

Methods:
A total of 538 HD patients with type 2 diabetes, 828 HD patients without diabetes, and 365 patients with type 2 diabetes and normal renal function were enrolled in the study. GA, HbA1c, and plasma glucose (PG) were evaluated for each patient. PG was obtained for a mean value during the 2 months prior to determining serum GA and HbA1c. The serum GA and HbA1c were measured once along with red blood cells, hemoglobin, hematocrit, total protein, albumin, blood urea nitrogen, and creatinine. Statistical analysis was performed to examine correlations of PG, hemoglobin, and erythropoietin dose with HbA1c and GA.

Results:
Glycemic control of the patients with diabetes was stable during the study period. The relationship between PG and GA was identical between HD patients with diabetes and those with diabetes and normal renal function. However, HbA1c was significantly lower in HD patients with diabetes than those with diabetes and normal renal function. The mean PG, GA, and HbA1c levels were significantly higher in HD patients with diabetes than HD patients without diabetes. These values were also lower in patients with no diabetes. Weekly erythropoietin doses were significantly greater in HD patients with diabetes compared to HD patients without diabetes. However, no significant difference was seen in hemoglobin and albumin between HD patients. PG and GA did not show significant differences between HD patients with diabetes and with and without erythropoietin injection. HbA1c were significantly higher in patients without erythropoietin.

Conclusions:
Glycated albumin was shown to be a more accurate method to assess glycemic control in HD patients with diabetes. A lower HbA1c relative to PG and GA in HD patients with diabetes compared to patients with diabetes and no chronic renal failure suggests that HbA1c may underestimate glycemic control in HD patients with diabetes. The mechanism for significantly lower HbA1c in those patients was explained by anemia and/or erythropoietin injection. Glycated albumin provides a significantly better measurement of estimating glycemic control in HD patients with diabetes than HbA1c.