GLYCATED ALBUMIN DOSAGE IN DIABETIC DIALYSIS PATIENTS: A MORE APPROPRIATE MARKER OF GLYCEMIC CONTROL IN CHRONIC KIDNEY DISEASE

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INTRODUCTION AND AIMS

Chronic kidney disease (CKD) is a condition that refers to a long-term loss of kidney function. Glucose homeostasis is extremely altered in patients with CKD, and it's particularly relevant when CKD patients are also diabetics. Glycated Albumin (GA) has been reported to be a better glycemic indicator than glycated hemoglobin (HbA1c) in hemodialysis (HD) patients with diabetes. Freedman *et al.*, 2008 reported the accuracy of the HbA1c assay in both HD and peritoneal dialysis (PD). HbA1c readings are falsely low in patients on either form of dialysis, thus calling into question the accuracy of the HbA1c assay in diabetic patients with severely reduced renal function and in those not yet on renal replacement therapy. The dosage of Glycated Albumin is interesting as a potential marker of glycemic control. Glycemic control is fundamental in the prevention and progression of complications associated with diabetes mellitus (DM), specifically in diabetic kidney disease. This study aimed to understand if in our cohort of HD and PD patients the dosage of Glycated Albumin could be a more appropriate marker of glycemic control, both in non-diabetic but especially in diabetic patients. If dialysis affects the HbAc1 measurement and in that case if the Glycated Albumin level can be a better maker according to the type of dialysis for diabetic patients.

METHODS

We enrolled in total 61 CKD patients. The cohort was made of 31 PD and 30 HD patients.

Patients were divided in four groups: PD without DM (17), PD with DM (14), HD without DM (16) and HD with DM (14).

Diabetic participants were taking oral hypoglycemic agents, insulin, or both and had a clinical diagnosis.

Blood samples were drawn at T0 and after one year (T1). For HbA1C and Glycated Albumin measurements, blood was drawn from the dialyzer circuit in subjects on HD, prior to initiation of dialysis or administration of anticoagulants.

For PD blood was drawn from peripheral venous puncture. The percentage of plasma Glycated Albumin (GA%) was determined by ILab650. QuantILab® Glycated Albumin assay (Instrumentation Laboratory, A Werfen Company, Milan, Italy) was based on an enzymatic method (Figure 1). Glucose were also measured by ILab650 as routine blood tests. We used Student T test for paired data or the analogous non-parametric test (Mann-Whitney) to compare outcome in different time in each group. For all the analyses we considered as a significant level $p<0.05$.

Figure 1: ILab 650 and quantILab® Glycated Albumin (Instrumentation Laboratory, a Werfen Company, Milan, Italy)

RESULTS

The mean age of enrolled patients was 64.2±13.9, 54% male. Trend of HbA1c levels from T0 to T1 was the same as GA% levels.

DM patients showed significantly higher levels of GA% compared to patients without DM both at T0 and T1 ($p<0.001$) (Figure 2).

We also performed the comparison within the two dialysis groups, analyzing separately PD and HD patients at T0 and T1.

Differences in GA% within PD and HD groups were relevant at baseline time T0 ($p<0.001$): PD without DM 12.9 (11.7-13.4) versus PD with DM 18.3 (17.5-22.6); HD without DM 13.9 (13.25-15.7) versus HD with DM 17.8 (15.7-22.8) (Figure 3). Differently, no significantly differences were observed at T1 ($p=0.06$). Moreover, HD patients with DM showed a difference also between the two time for GA%, respectively 17.8 (15.7-21.8) at T0 versus 18.3 (15.8-22.0) at T1 ($p<0.001$).

Figure 2: GA% at T0 and T1 in dialysis patients without and with DM

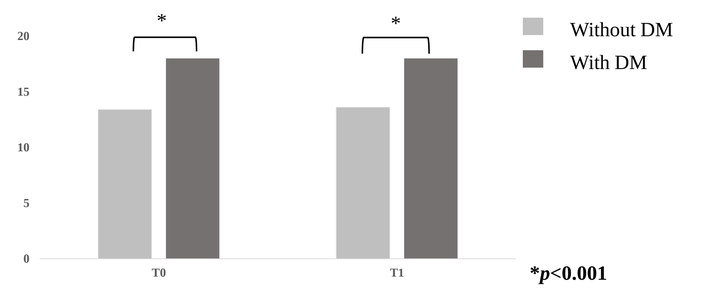
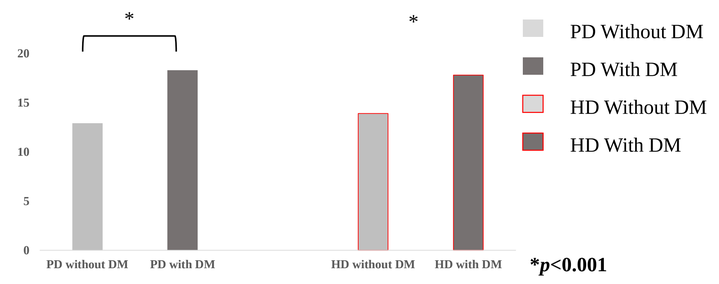


Figure 3: GA% at T0 in PD and HD patients without and with DM



CONCLUSIONS

HbA1c is falsely low in CKD patients and this could be placing diabetic patients at risk for rapid progression of nephropathy and speeding the development of complications. Our results showed that GA% detected precisely those patients who had DM, both in PD and HD groups. We can conclude that dosage of GA% is a good marker of glycemic control in dialysis patients, more appropriate than HbA1c.

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