EXPLORING THE ACCURACY OF A CONTINUOUS GLUCOSE MONITORING DEVICE AMONG DIABETIC PATIENTS ON HEMODIALYSIS

M. Divani,[1] P.I. Georgianos,[2] F. Iliadis,[1] T. Didangelos,[1] A. Mekedou,[3] V. Liakopoulos,[2] A. Hatzitolios,[1] D.M. Grekas[1]

1)1st Propedeutic Department of Medicine, AHEPA University Hospital, Thessaloniki, Greece; 2) Hemodialysis Unit, 1st Department of Medicine, AHEPA University Hospital, Thessaloniki, Greece; 3) Laboratory of lipidology, 2nd Department of Pediatrics, AHEPA University Hospital, Thessaloniki, Greece

Introduction: Among diabetic patients on maintenance hemodialysis, assessment of glycemic control status with the use of currently widely applied glycemic control indices is of limited diagnostic accuracy [1-3]. Evaluation of short-term glucose variability with continuous-glucose-monitoring (CGM) may improve the glycemic control assessment in these patients [4]. The aim of this study is to evaluate the accuracy of CGM in assessing short-term glucose variability in diabetic hemodialysis patients.

Material and Methods: A total of 37 diabetic patients receiving maintenance hemodialysis for at least 3 months participated in this study. All patients underwent a 7-day-long CGM with the use of the MiniMed CGM device (Medtronic Diabetes, Northridge, CA, USA). We assessed the agreement between (i) the CGM-derived glucose and the laboratory-derived glucose in blood samples taken before a mid-week dialysis session, (ii) the CGM-derived glucose and self-measured glucose in 1,169 validation time-points over the 7-day CGM, and (iii) the CGM-derived glycated hemoglobin AIc (HbA1c) and the HbA1c calculated from the mean of glucose measurements taken by the patients themselves throughout the study.

Results: The demographic and clinical characteristics of study participants are depicted in (**Table** 1). The mean age of study participants was 62.0±12.7 years and the dialysis vintage was 37.1±6.9 months. As shown in (**Table** 2), CGM-derived glucose did not significantly differ from the laboratory-derived glucose (156.6±50.7 vs 158.3±58.9 mg/dl, p=0.89) and self-measured glucose (160.6±62.3 vs 161.3±66.2 mg/dl, P=0.80). Similarly, CGM-derived HbA1c was identical with the HbA1c calculated from mean self-measured glucose (7.28±1.3 vs 7.26±1.3%, p=0.93). Correlation analysis revealed strong positive associations between the CGM-derived and laboratory-derived glucose (r= 0.971, P<0.001) as well as between CGM-derived and self-measured glucose (r= 0.970, P<0.001) **(Figure 1).** The Bland-Altman plots showed acceptance agreement and no evidence of systemic bias for glucose measurements taken by CGM, self-measurement and laboratory analysis.

Conclusion: This study shows that CGM using the MiniMed Medtronic device is an accurate method to assess short-term glucose variability in diabetic hemodialysis patients.

Table 1: Baseline characteristics of study participants

Parameter	Value
N	37
Age (years)	62.0±12.7
Gender (M/F)	20/17
Dialysis vintage (months)	37.1±6.9
Weight (kg)	75.9±13.8
Height (m)	1.6±0.1
BMI (kg/m^2)	26.9±4.2
Hypertension (%)	32, (86.5%)
History of CHD (%)	23, (62,2%)
History of CHF (%)	17, (45.9%)

Table 2: Comparison of glycemic parameters measured by the patients themselves and the CGM device over a 7-day-long period.

Parameter	Self-measured	CGM-derived	Absolute difference ± SE	P value
Glucose (mg/dl)	161.3±66.0	160.6±62.7	0.67±2.65	0.80
HbA1c (%)	7.27±1.3	7.28±1.3	-0,01±0,31	0.93

Figure 1: Correlation analysis between CGM-derived and self-measured glycemic parameters.

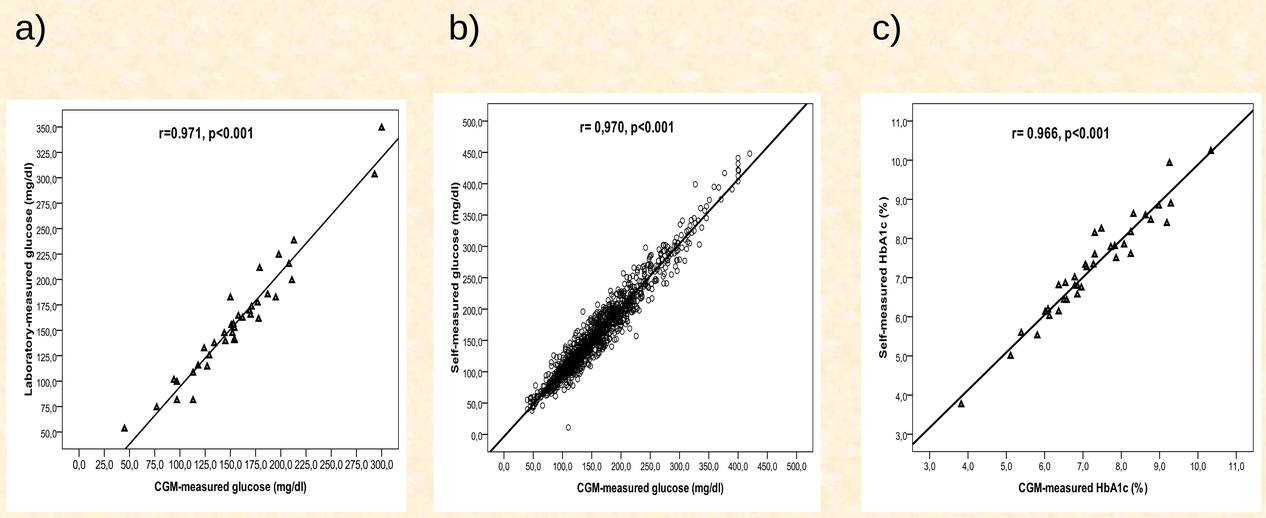
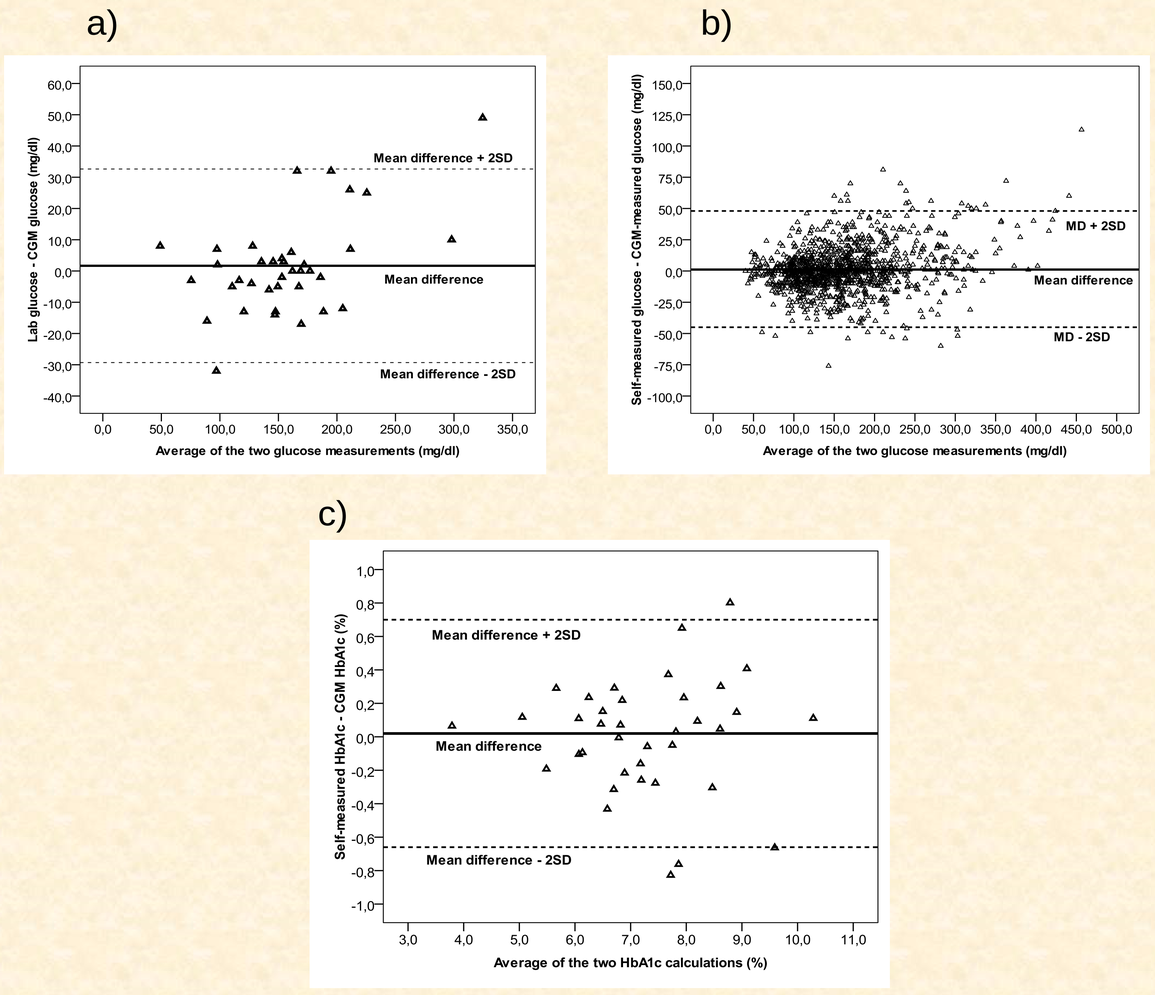


Figure 2: Bland-Altman plots of the agreement between CGM-derived and self-measured glycemic parameters.



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DOI: 10.3252/pso.eu.54ERA.2017