

IMPACT OF VISCERAL ADIPOSE TISSUE AND SUBCLINICAL OVERHYDRATION ON TIME IN RANGE AND GREATER GLUCOSE VARIABILITY IN PATIENTS WITH TYPE 2 DIABETES ON HEMODIALYSIS

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INTRODUCTION

Glycemic variability (GV) between hemodialysis (HD) and non-HD days is a clinically relevant phenomenon in patients with type 2 diabetes (T2D) treated with insulin. However, the clinical and body composition factors underlying this variability remain poorly defined. The aim of this study was to evaluate whether visceral fat area (VFA) and the extracellular-to-total body water ratio (ECW/TBW) are associated with a reduction in Time in Range (TIR) between HD and non-HD days.

METHODS

This was a prospective observational study including 67 insulin-treated patients with T2D undergoing HD. Continuous glucose monitoring (CGM; Dexcom One Plus) was performed for 20 days. Clinically relevant glycemic instability was defined as a Δ TIR >5% between HD and non-HD days. VFA and ECW/TBW were assessed by bioimpedance analysis. Statistical analysis group comparisons were performed using parametric or non-parametric tests as appropriate. *Multivariable logistic regression* was assessed, and included age, diabetes duration, time on hemodialysis, interdialytic weight gain, ECW/TBW ratio, phase angle, visceral fat area, insulin regimen, and diabetes-related complications, using forward stepwise selection.

RESULTS

Table 1. Baseline clinical and body composition characteristics according to Δ TIR

Variable	Δ TIR <5% (n=30)	Δ TIR >5% (n=37)	p-value
Age (years)	71.66 $\pm$ 11.04	68.29 $\pm$ 12.37	0.146
Diabetes duration (years)	18.69 $\pm$ 6.61	20.50 $\pm$ 8.66	0.231
Time on HD (years)	3.07 $\pm$ 3.67	1.60 $\pm$ 2.15	0.982
BMI (kg/m ²)	29.49 $\pm$ 5.67	26.23 $\pm$ 5.59	0.013
Waist/Height ratio	0.56 $\pm$ 0.09	0.55 $\pm$ 0.16	0.230
VFA (cm ²)	119.56 $\pm$ 50.04	86.45 $\pm$ 50.15	0.010
SMI (kg/m ²)	7.62 $\pm$ 0.97	7.89 $\pm$ 1.33	0.530
ECW/TBW ratio	0.388 $\pm$ 0.010	0.396 $\pm$ 0.021	0.009
Phase angle (°)	5.16 $\pm$ 1.36	4.30 $\pm$ 0.89	0.018
Waist circumference (cm)	88.91 $\pm$ 12.72	79.00 $\pm$ 11.76	0.002
Waist circumference (cm)	74.83 $\pm$ 14.24	68.50 $\pm$ 13.93	0.072
Hemoglobin (g/dL)	11.39 $\pm$ 1.43	11.02 $\pm$ 1.33	0.278
Ferritin (ng/mL)	390.21 $\pm$ 217.44	335.23 $\pm$ 233.56	0.233
HbA1c (%)	6.49 $\pm$ 1.11	7.10 $\pm$ 1.60	0.104
Albumin (g/dL)	3.84 $\pm$ 0.33	3.65 $\pm$ 0.42	0.135
Triglycerides (mg/dL)	158.62 $\pm$ 75.71	135.54 $\pm$ 89.19	0.092
Glucose (mg/dL)	163.52 $\pm$ 62.64	199.04 $\pm$ 87.00	0.021
Dialysis dose (Kt/V)	2.03 $\pm$ 0.37	2.00 $\pm$ 0.39	0.816
Blood flow (Qb, mL/min)	379.05 $\pm$ 20.41	370.94 $\pm$ 24.95	0.245

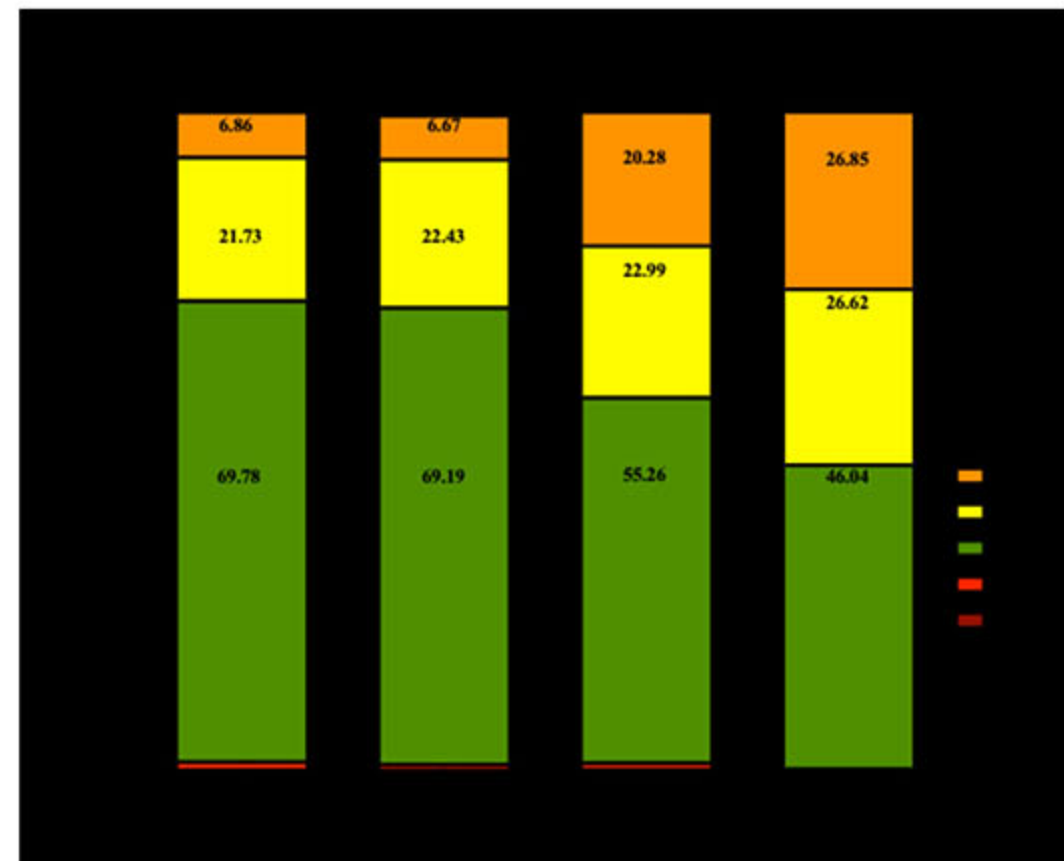


Figure 1. Glycemic profiles stratified by dialysis days between Δ TIR groups during HD and off-HD days. ** p < 0.05 differences between HD and off-HD days.

Multivariate analysis identified ECW/TBW ratio (positive), VFA, and time on HD (both negative) as independent predictors of Δ TIR >5% (all p < 0.05).

CONCLUSIONS

ECW/TBW ratio, VFA, and time on HD are independent predictors of TIR decline between HD and non-HD days in insulin-treated T2D patients. These findings highlight the importance of integrating hydration status, body composition, and HD exposure to optimize metabolic control in this vulnerable population.