DOES SUBSTITUTION VOLUME INFLUENCE METABOLIC PROFILE OR BODY COMPOSITION IN DIABETIC PATIENTS ON ONLINE HEMODIAFILTRATION?

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INTRODUCTION AND OBJECTIVES

Online hemodiafiltration (OL-HDF) with high convective volumes (CV) improves patient survival compared with high-flux hemodialysis[1]. Recently, it has been proposed to limit the amount of convective transport in patients with diabetes mellitus, due to glucose load that is administered with the replacement fluid[2]. The aim of this study is to analyze the influence of substitution volume in the evolution of metabolic profile and body composition of incident diabetic patients in OL-HDF.

METHODS: Prospective observational study in 29 diabetic patients incident on postdilution OL-HDF, three 4-hours sessions weekly. Baseline data included clinical and demographic characteristics, laboratory parameters (metabolic, nutritional and inflammatory profile) and body composition with bioimpedance spectroscopy (BIS). We collected laboratory parameters and mean substitution volume every four months, and in 23 patients another BIS was performed after a minimum follow-up of one year. Variations of glycosylated hemoglobin (HbA1c), triglycerides (TG), total cholesterol, LDL-c, HDL-c, albumin, prealbumin and C reactive protein (CRP) were calculated at one year, two years, three years, and at the end of follow-up. Also quarterly and annual variations were calculated, as well as changes in body composition by BIS. Substitution volume was adjusted to body composition parameters. Variations were collected to evaluate the influence of substitution volume in the changes of metabolic profile and body composition.

RESULTS

Baseline patient, laboratory and bioimpedance data

Age (years)	69.7±13.6
Gender: male (%)	62.1
Time on dialysis (months)	48 (35.5 – 76)
CKD etiology (%):	
· Diabetic nephropathy	79.3
· Renal vascular disease	10.3
· Glomerular disease	6.8
· Others	3.4
Vascular access: AV fistulae (%)	88.9
Weight (Kg)	72.3±13.9
Body mass index (Kg/m²)	27.1±5.4
Body surface area (m²)	1.78±0.16
DM type 1 (%)	3.4
DM type 2 (%)	96.6
• Insulin therapy (%)	81.5
• Antidiabetic drugs (%)	7.4
• Diet and exercise (%)	14.8
• Statins (%)	51.9

HbA1c (% / IFCC units)	6.96 ± 1.3 / 52 ± 11
Triglycerides (mg/dL)	133.4 ± 58
Total cholesterol (mg/dL)	153.4 ± 37
HDL-c (mg/dL)	45 ± 14
LDL-c (mg/dL)	83.1 ± 28.1
Albumin (g/dL)	3.82 ± 0.43
Prealbumin (mg/dL)	24.9 ± 7.4
C-reactive protein (mg/dL)	1.1 (0.6 – 1.9)

Total body water (L)	36.7 ± 7.4
Extracellular water (L)	17.7 ± 3.1
Intracellular water (L)	18.9 ± 4.5
Overhydration (L)	1.89 ± 1.52
Lean tissue mass (Kg)	29.9 ± 14.3
Lean tissue index (Kg/m²)	14.5 ± 3.9
Fat mass (Kg)	21.4 ± 12.7
Fat tissue index (Kg/m²)	11.6 ± 6.6
Adipose tissue mass (Kg)	30.5 ± 16.3
Body cell mass (Kg)	22.1 ± 8.3

No correlations were observed between substitution volume and changes in weight, body mass index, or bioimpedance data in the period between BIS measurements.

Quarterly comparisons (n 271) showed negative correlation between substitution volume and variations in HbA1c (-0.146, p 0.021).

OL- HDF beginning

n = 29

INCLUSION CRITERIA
- Over 18 years old.
- Diabetes mellitus diagnosed at OL-HDF beginning.
- Postdilution OL-HDF, 12 hours a week in 3 sessions.
- Minimum follow-up 8 months.

- Change in dialysis modality [n =2]
- Kidney transplant [n=2]
- Death [n = 9]

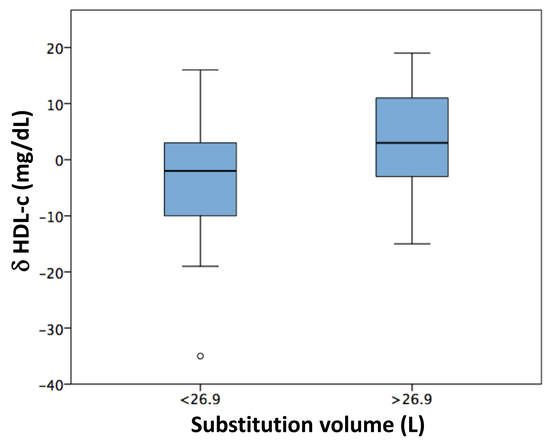
n = 16

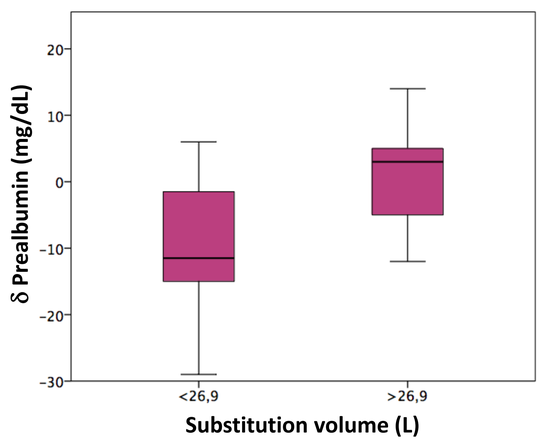
End of study (31-Dec-2016)

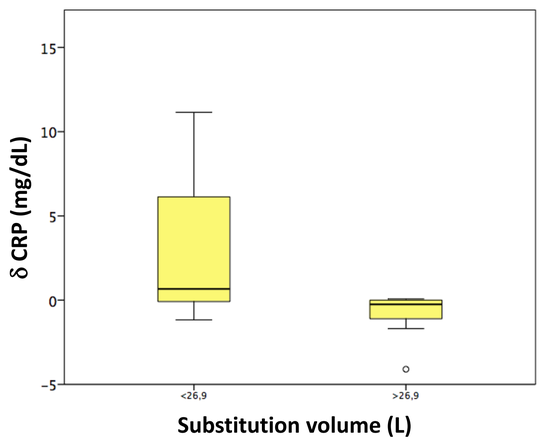
Mean substitution volume: 26.9 ± 2.9 L/session.

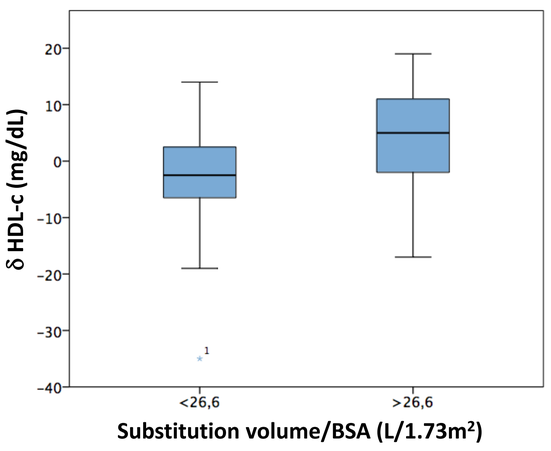
Mean follow-up period: 40.4 ± 26 months.

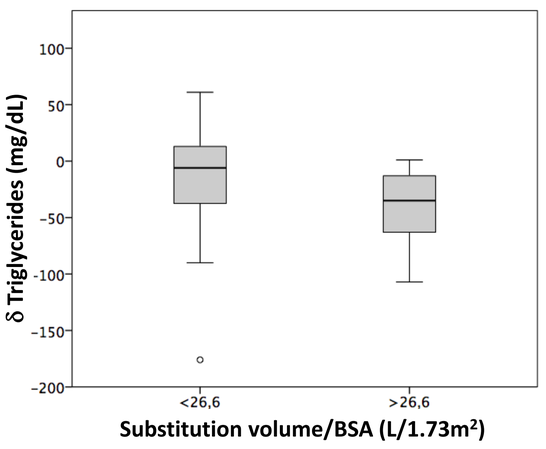
We found significant correlation between average substitution volume and final changes in HDL-c (R: 0.385, p 0.039), prealbumin (R: 0.404, p 0.003) and CRP (R: -0.498, p 0.007).
Also, convective dose adjusted with BSA was related with changes in HDL-c (R: 0.393, p 0.035) and inversely correlated with changes in TG (R: -0.423, p 0.022) and CRP (R: -0.573, p 0.007), observed since the second year.

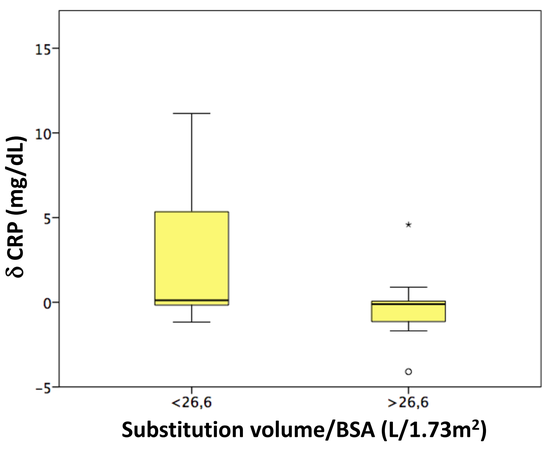












HbA1c showed positive correlation with albumin (0.294, p<0.001), prealbumin (0.298, p <0.001), TG (0.400, p<0.001) and HDL-c (-0.131, p 0.022) serum levels. Elevated CRP was associated with lower HbA1c (-0.410, p 0.034) and triglycerides (-0.465, p 0.015).

CONCLUSION: Higher convective dose is associated with a slight improvement in metabolic profile in diabetic patients in OL-HDF, and with a reduction in inflammatory parameters. No negative changes were observed with high convective volumes. There is not enough evidence to restrict the convective transport in patients with diabetes due to the glucose content of the replacement fluid.

REFERENCES
1. Maduell F, et al; ESHOL Study Group.. High-efficiency postdilution online hemodiafiltration reduces all-cause mortality in hemodialysis patients. J Am Soc Nephrol. 2013 Feb;24(3):487-97.
2. Marano M, et al. On-Line Hemodiafiltration: All That Glitters Is Not Gold. Blood Purif. 2016;41(4):315-6.

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