REDUCTION OF ADMA SERUM LEVEL: SUPRA HFR VERSUS HDF ON LINE COMPARISON

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INTRODUCTION

Several epidemiological studies documented an increase in Asimmetric dimethylarginine (ADMA) in patients with CKD and have identified ADMA as an independent predictor of the severity of the disease as well as the associated cardiovascular complications.

A large effort to understand which is the best dialysis technique to remove ADMA has not achieved definitive results. Some studies point out that ADMA could be a protein bound, and this significantly affect ADMA dialysance

SUPRA is a form of Haemodiafiltration (HDF) that utilizes separately convection, diffusion and adsorption. A two-stages filter, consisting of a Synclear 0,2 fiber (hyper permeability membrane with albumin sieving coefficient in water solution of 0.2) in the 1st convective stage and a low flux polyethersulfone filter in the 2nd diffusive stage, is applied to enhance complete separation of convection from diffusion. The convective phase of the 1st stage extract pure ultrafiltrate (plasmatic water) that passes through a sorbent cartridge (Suprasorb cartridge containing 80 ml of hydrophobic styrene resin) that posses high affinity for several uremic toxins and middle molecules

Aim of this work is to investigate if SUPRA technique is able to reduce intra- and inter-dialytic serum ADMA levels compared to HDF on Line (HDF-OL)

METHODS

Twenty ESRD patients (11 M), were enrolled in a prospective randomized study. Patients were randomized in two groups (Arm A and Arm B). After one week of washout stabilization period in standard bicarbonate dialysis (BD) for both Arm, the sequence of treatments was: three weeks of Supra, followed by one week of BD, followed by three weeks of HDF-OL for Arm A and vice versa for Arm B (fig 1)

The mean age and the dialysis vintage of patients were respectively 72 15 years and 71 61 months. Treatments characteristics were: Qb: (329 35) mL/min, Qd: 500 mL/min for a treatment time of (232 19) minutes, in both techniques, three times a week.

Serum samples were taken at the beginning and at the end of each middle week session (for supra and HDF-OL period), marked as T1, T2 and T3, and used for ADMA value determination by immune assay method (DLD Diagnostika GmbH).

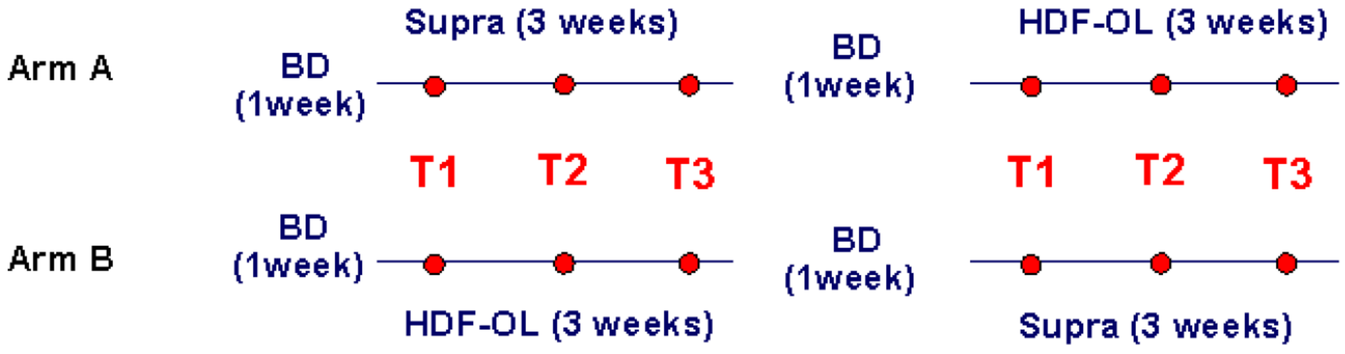

Fig 2: Schematic representation of the study design. Red points represent the sampling times (middle week session)

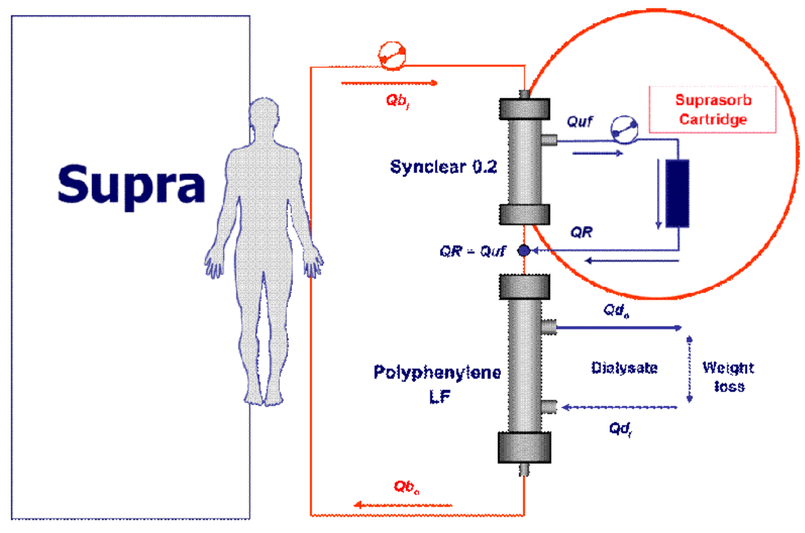

Fig 1. The Supra Scheme; In the convective phase of the first stage, plasmatic water passes through a sorbent cartridge containing 80 ml of hydrophobic styrene resin (Suprasorb; Bellco Srl, Mirandola, Italy) constituted by numerous pores and channels that add to its extensive surface area.

RESULTS

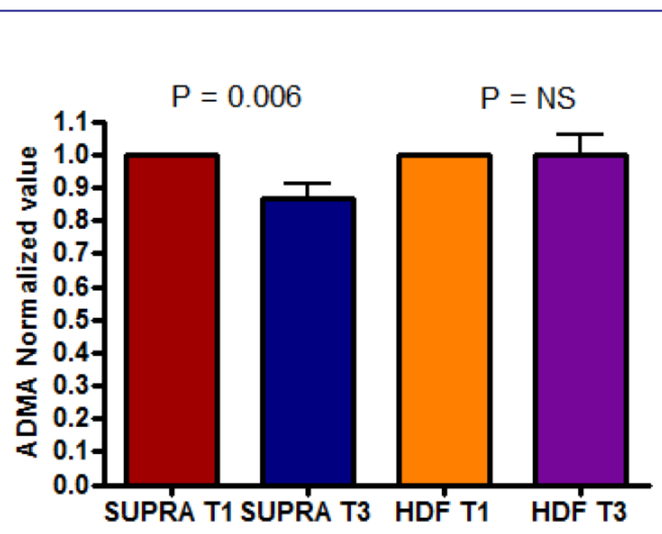

Fig 3: ADMA pre-dialytic normalized concentration at beginning (T1) and after three weeks of treatment (T3)

Gender:	11M – 9F
Age (yr):	71 ± 15
BMI (kg/m^2):	25 ± 4
Dialytic Vintage (mo):	71 ± 61
Body Weight (kg):	69,8 ± 15,0
Dialysis Time (min):	232 ± 19
Qb (ml/min):	329 ± 35
Qd (ml/min):	500

Table 1: Patients demographics and dialytic characteristics

	Group A	Group B	P
HDF OL T1	0,76 ± 0,04	0,80 ± 0,03	NS
SUPRA T1	0,94 ± 0,07	0,88 ± 0,06	NS

Table 2: ADMA pre-dialytic values in the two groups at T1

ADMA levels (µmol/L) were at beginning and at the end of all dialytic session 0.82 0.02 and 0.42 0.01 for SUPRA, and 0.77 0.02 and 0.42 0.01 for HDF OL.

Although no statistical differences were obtained in the Reduction Ratio percentage (RR%) between Supra (47.4 1.3) and HDF ol (46.2 1.7) a statistically significant decreasing of pre dialysis ADMA concentration has been found for patients treated continuously with Supra (0.91 0.05 at T1 vs 0.76 0.03 at T3 p=0.0061) in the respect with HDF OL (0.78 0.03 at T1 vs 0.77 0.04 at T3 p=NS)(Fig3).

As shown in table 2 the two group of patients doesn't differs in pre dialytic ADMA concentration, therefore in the statistical analysis data from the two groups were used together

CONCLUSIONS

These results could be explained with the SUPRA ability in decreasing in general the inflammatory status of ESRD patients due to the adsorptive cartridge capability toward pro-inflammatory and inflammatory cytokines. This ability could also influence the complex mechanism of ADMA concentration in the blood as a result of interaction between production, enzymatic degradation, tissue redistribution, re-equilibration and hypothetical ADMA binding to protein.

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