COMPARISON OF THE HEMODYNAMIC TOLERANCE AND THE BIOLOGICAL PARAMETERS OF FOUR ACETATE-FREE DIALYSIS METHODS IN A GROUP OF THRICE WEEKLY HEMODIALYSIS PATIENTS

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OBJECTIVES

The presence of 3-8 mmol/l of acetate in haemodialysis solutions leads to a significant mass being infused in the patients on on-line HDF exposing them to its inflammatory, vasodilatatory and cardio-depressive effects. Citrate has been proposed as an optimal substitute for acetate

The aim of the present trial was the comparison of the hemodynamic and biological parameters on a group of patients dialysed consecutively with 4 acetate-free haemodialysis techniques

METHODS

In a prospective crossover study we measured the hemodynamic and biological effects of four acetate-free hemodialysis methods: the Acetate free Biofiltration with variable potassium (AFBK) and three methods with a citrate buffer, the conventional Hemodialysis (HD), on-line hemodiafiltration (HDF) and on-line Hemofiltration (HF). Fourteen chronic hemodialysis patients (9 males mean age 72.21± 11.21 years old) underwent 6 four-hour dialysis sessions for 2 weeks on each of the 4 studied techniques

GRAPHICS AND TABLES

mmHg(±SD)	SAPmin	SAPmax	SAP0	SAP1	SAP2	SAP3	SAP4
AFBK	117,03±21,56	149,53±22,18	140,84±25,58	128,67±22,7	132,34±23,19	132,34±24,99	130,6±25,15
HD	100,98±25,64	141,61±24,94	136,84±26,65	121,44±23,1	115,38±27,30	115,38±27,29	113,58±29,47
HDF	97,33±21,19	134,4±24,63	130,57±25,04	115,73±23,07	109,48±25,26	109,48±22,48	108,42±23,90
HF	100,21±24,27	139,02±26,55	133,6±27,88	116,78±24,76	113,06±26,78	113,06±23,74	119,2±26,4
p	<0,001	0,001	NS	0,002	<0,001	<0,001	<0,001

Table 1

Mmol/l	Nabaseline	Na1st hour	Na2nd hour	Na3d hour	Na4th hour
AFBK	138,42±2,31	140,93±2,02	141,86±1,88	141,78±1,48	142,93±1,27
HD	136,86±2,57	137,21±2,55	137,21±1,97	137,14±1,23	138,00±1,80
HDF	136,85±3,18	137,08±2,18	137,53±2,15	137,69±1,97	137,62±1,56
HF	137,23±4,15	136,92±3,33	137,23±3,14	136,54±2,93	137,15±3,39
p	NS	<0,001	<0,001	<0,001	<0,001

Table 2

Mmol/l	DeltaK0-1	Delta K1-2	Delta K 2-3	Delta K 3-4	nPCR	KT/V
AFBK	0,54±0,24	0,41±0,29	0,24±0,19	0,17±0,20	0,82±0,18	1,32±0,28
HD	1,16±0,39	0,26±0,19	0,24±0,16	0,05±0,20	0,92±0,20	1,63±0,28
HDF	0,99±0,28	0,23±0,23	0,23±0,14	0,01±0,20	0,92±0,17	1,74±0,33
HF	0,46±0,38	0,44±0,47	0,19±0,28	0,12±0,26	0,72±0,14	0,66±0,18
	<0,001	NS	NS	0,031	0,015	<0,001

Table 3

RESULTS

The AFBK technique was associated with a minimal rate of intradialytic hypotensive episodes (1 in 84 sessions) compared to the other techniques (HD: 29/84, HDF 22/82 and HF: 14/78, p<0.001)

The maximal (SAPmax) and minimal (SAPmin) intradialytic systolic and blood pressure as well as the systolic blood pressure after one (SAP1), two (SAP2) , three (SAP3) hours of dialysis and at the end of the hemodialysis session (SAP4) was significantly higher in the AFBK technique.The predialytic systolic (SAP0) arterial pressure was not found significantly different between the various methods (Table 1). The same differences were found concerning the diastolic arterial pressure

On AFBK the net Ultrafiltration (UF) (p<0.001) and the UF as a percentage of the dry weight (p=0.005) were significantly higher. Regarding the biological parameters, after the first, second, third hour and at the end of the dialysis session there were significant differences between groups concerning the serum Sodium (Table 2) , Potassium, Calcium, Phosphate Urea, Creatinine and Magnesium concentrations.

Concerning the hourly reduction of serum potassium and sodium concentration (Table 3) there was a significant difference between the four methods during the first hour of dialysis and no differences thereafter. There were significant differences between the methods concerning the efficacy of the dialysis KT/V (p<0.001) and the nPCR (p=0.015) with AFBK and HF presenting the lowest values

A significant correlation between the prevalence of hypotensive episodes and the change of serum sodium (p<0.001) as well as potassium levels (p=0.002) during the first hour of dialysis was detected. There were no correlations between these parameters after the first dialysis hour

CONCLUSION

AFBK technique is associated with lesser hypotensive episodes and a better tolerance of the dialysis session. The rate of intradialytic modification for the serum electrolytes has been found to correlate with the dialytic hemodynamic tolerance

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