MID-TERM EVALUATION OF CITRATE DIALYSATE-REINFUSATE IN ON-LINE POSTDILUTIONAL HEMODIAFILTRATION

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INTRODUCTION / AIM

During HDF even low acetate concentrations in the dialysate-reinfusate (dAC) result in a sharp increase of serum AC, which induces the release of pro-inflammatory mediators [1].

A citrate-based concentrate (dCIT) was recently marketed, but, since CIT binds Ca++ and can change Ca mass balance, this concentrate is not yet widely used.

The **Aim** of the present study was to evaluate the effect of replacing dAC with dCIT upon Ca and PTH level during high-volume HDF online. A secondary end point was to evaluate the best strategy aimed to avoid undesirable changes on pre-dialysis PTH value

METHODS

In 16 patients (pts) on long-term HDF (tab. I), dAC (3.0 mmol/l) was substituted with dCIT (1 mmol/l, Selectbag Citrate, Gambro) on acid concentrate for one week, keeping unchanged for each pt the oral therapy and dCa (1.5 mmol/l) (Period 1). During the following 6 months of follow-up on CIT-HDF, the mean dose of CaCO3 and Calcitriol was increased (25 and 46%, respectively) (Period 2). During the last 6 months (Period 3), dCa was kept unchanged in 3 pts and was increased in 13 (1.65 mmol/l) and oral therapy returned to baseline prescription. The HD machine (ARTIS, Gambro) and the other hemodialysis prescription parameters (tab. II) were kept constant through all the periods. At the baseline and at the end of each period, PTH, total and ionized Calcium (Ca Tot, Ca++) were measured at pre and post-dialysis in the mid-week session. Moreover, in the same sessions, total convective volume was recorded.

Statistics: The descriptive analysis was based on the mean ± standard deviation. Inferential statistics included two tailed t-test for paired data, considering a probability value of less than 0.05 as significant.

Patient's data	Value (N=16)
Gender	F=6 / M=10
Age (years)	70±8
HD Vintage (mo)	51±66
Calcitriol (ug/week)	1.2±0.4 (7 pts)
Cinacalcet (mg/day)	35±15 (4 pts)
$CaCO_3$ (g/day)	2.9±1.4 (9 pts)
Sevelamer (mg/day)	3500±1900 (4 pts)
EPOα (Binocrit, U/week)	5000±2300 (10 pts)
Hb (g/dL)	11.5±1.3
Albumin (g/dL)	4.2±0.4

Table I: *Study population*

Parameters	Baseline	Period 1	Period 2	Period 3
Dialyzer	Polyflux 210H	Polyflux 210H	Polyflux 210H	Polyflux 210H
Qb (ml/min)	350 – 400	350 – 400	350 – 400	350 – 400
Qd (ml/min)	500	500	500	500
Treatment Time (min)	260±18	260±18	260±18	260±18
dNa (mmol/l)	133±2	133±2	133±2	133±2
$dHCO_3$ (mmol/l)	31±1	31±1	31±1	31±1
dCa (mmol/l)	1.50	1.50	1.50	1.65
dMg (mmol/l)	0.5	0.5	0.5	0.5
dAcetate (mmol/l)	3.0	-	-	-
dCitrate(mmol/l)	-	1.0	1.0	1.0

Table II: *Dialysis Setup on the study follow-up*

RESULTS

At baseline (AC-HDF) the Ca Tot level (fig.1) increased during the session (from 2.31±0.12 to 2.63±0.16 mmol/l, p<0.0001), while it was stable during Period 1, but it increased again in Period 2 and 3 (Period 1: from 2.37±0.14 to 2.42±0.11 mmol/l, p=0.12; Period 2: from 2.31±0.15 to 2.47±0.11 mmol/l, p<0.01; Period 3: from 2.23±0.08 to 2.60±0.10 mmol/l, p<0.0001). The Ca++ (fig.2) increased in Ac-HDF (from 1.13±0.05 to 1.22±0.03 mmol/l, p<0.0001) and decreased during the Cit-HDF treatments, except the Period 3 (Period 1: from 1.12±0.07 to 1.07±0.03 mmol/l, p<0.01; Period 2: from 1.09±0.07 to 1.05±0.03 mmol/l, p<0.03; Period 3: from 1.14±0.07 to 1.12±0.09 mmol/l, p<0.55). The PTH (fig.3) consistently followed the iCa, decreasing in Ac-HDF (273±196 to 141±99 pg/ml, p<0.0001) and increasing during the other Cit-HDF treatments, except during Period 3 (Period 1: from 298±174 to 358±178 pg/ml, p<0.01; Period 2: from 337±207 to 409±204 pg/ml, p<0.005; Period 3: from 246±223 to 189±130 pg/ml, p<0.01). Finally, the Convective Volume (fig.4), set automatically by TMP biofeedback (UltraControl, Gambro), increased by citrate introduction, although not significantly (Baseline: 24.7±2.6 L, Period 1: 26.0±2.6 L, Period 2: 26.1±3.9 L, Period 3: 26.0±2.6 L, p=0.06).

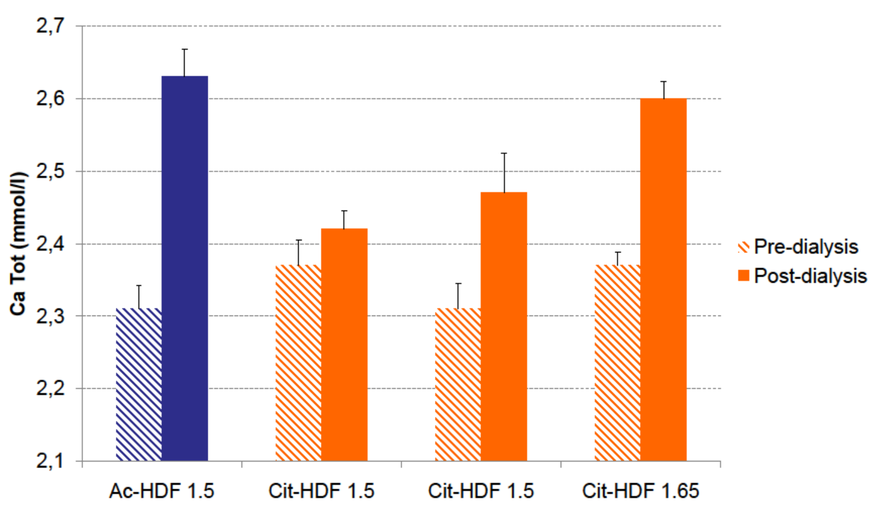


Figure 1: *Ca Tot pre and post-dialysis at the baseline (Ac-HDF; blue columns) and Period 1, 2, 3 (respectively Cit-HDF 1.5, Cit-HDF 1.5 and Cit-HDF 1.65; orange columns). Data are shown as mean±SEM.*

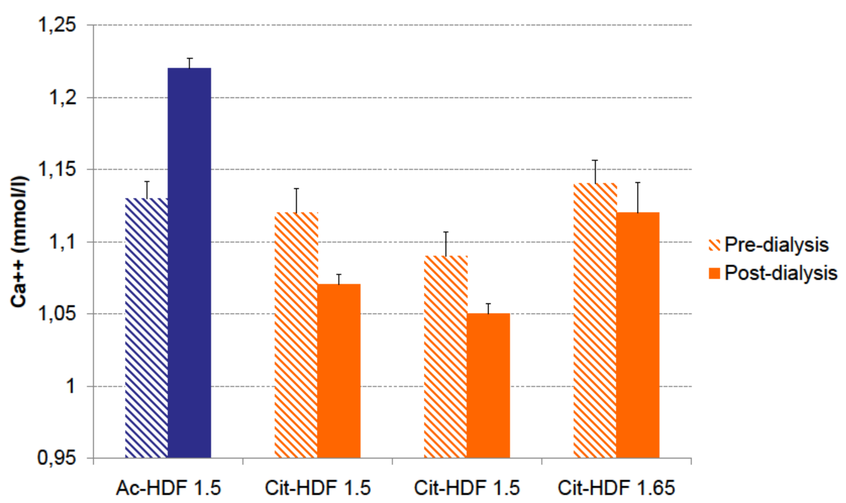


Figure 2: *Ca++ pre and post-dialysis at the baseline (Ac-HDF; blue columns) and Period 1, 2, 3 (respectively Cit-HDF 1.5, Cit-HDF 1.5 and Cit-HDF 1.65; orange columns). Data are shown as mean±SEM.*

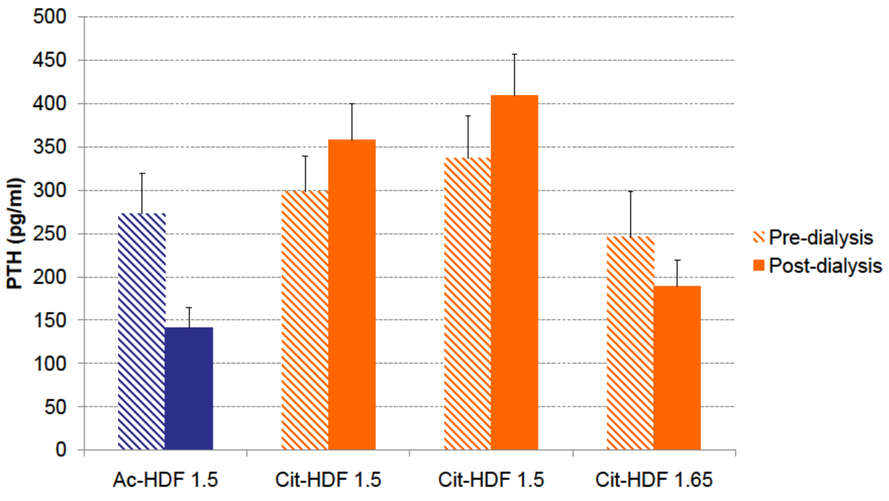
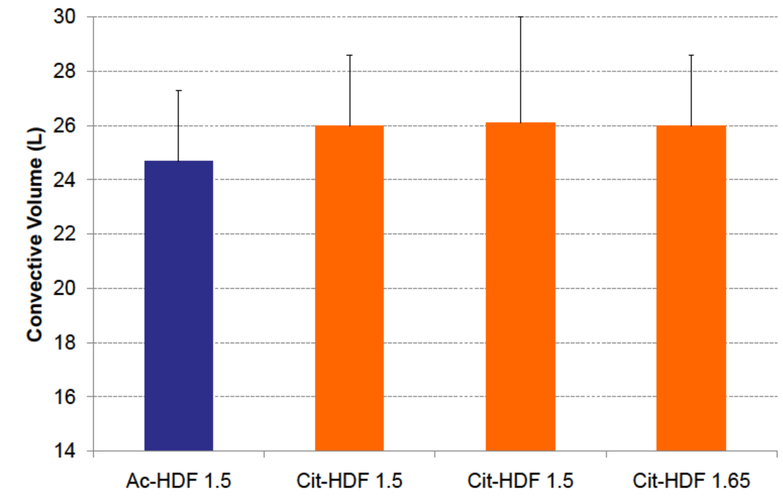


Figure 3: *PTH pre and post-dialysis at the baseline (Ac-HDF; blue columns) and Period 1, 2, 3 (respectively Cit-HDF 1.5, Cit-HDF 1.5 and Cit-HDF 1.65; orange columns). Data are shown as mean±SEM.*

Figure 4: *Convective Volume at the baseline (Ac-HDF; blue columns) and Period 1, 2, 3 (respectively Cit-HDF 1.5, Cit-HDF 1.5 and Cit-HDF 1.65; orange columns). Data are shown as mean±SD.*



CONCLUSIONS

The adequate dialysate Ca in extracorporeal dialysis is still debated and should be chosen on the basis of clinical factors. If a negative Ca balance is unwanted on CIT-HDF, the increase of dCa of 0.15 mmol/l can be taken into account as first approach and the increase of oral therapy (Calcium an/or Vit. D derivates) as a second step.

REFERENCES

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Giovanni Calabrese
DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM 2014
PosterSessionOnline.com