

# DIALYSATE BICARBONATE VARIATION IN PATIENTS ON REGULAR HEMODIAFILTRATION PROGRAM: IMPACT ON INTRADIALYTIC HYPOTENSION AND INTERDIALYTIC WEIGHT GAIN

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## Introduction

- Hypotension is a common intradialytic complication<sup>1,2</sup>;
- High ultrafiltration rate, usually in the context of greater interdialytic weight gain (IDWG) is one of the main causes<sup>1,2</sup>;
- There are few studies that correlate different bicarbonate concentrations in the dialysate with mortality and other clinical outcomes. The few data on this subject were obtained in patients on haemodialysis (HD) and not in haemodiafiltration (HDF);
- Higher dialysis bicarbonate (DB) concentrations and metabolic alkalosis have been associated with increased risk of intradialytic hypotension and it has been assumed to be due to the development of metabolic alkalosis during and after HD session<sup>3,4</sup>;
- Higher concentration of DB may be associated with increased salt and water retention and hence IDWG<sup>3</sup>. This associations have a low level of evidence.

## Aim

- To compare the effect of two different dialysate bicarbonate concentrations (34mmol/L versus 30mmol/L) on rate of intradialytic hypotension and IDWG.

## Methods

- Randomized, prospective and single center study that included prevalent patients on HDF that were divided into two groups with different DB concentration (30 mmol/L and 34 mmol/L);
- Inclusion criteria:**
  - Patients under four hours/session of high volume online post-dilution HDF (>20L/session);
  - HDF session three times/week;
  - Patients on HDF for at least three months;
- Exclusion criteria:**
  - Patients on HDF with DB concentration different of 34mmol/L less than one month prior to randomization;
  - Patients with severe malnutrition (albumin < 2 g/dL);
  - Patients with prolonged hospitalization (> 3 weeks);
- Dialysate composition:** dry acid concentrate Granudial AF®, calcium 1,5mmol/L, potassium 2,0mmol/L and magnesium 0,5mmol/L;
  - Qd 500 ml/min;
- Categorical variables were presented as proportion and continuous variables as mean ± SD or median (Q25, Q75) according to the normal distribution;
- The difference between continuous variables was calculated using Student's T-test or Mann-Whitney test, as appropriate. A P value <0.05 was considered significant;
- The intradialytic hypotension rates and IDWG were compared using the Chi-Square test;
- The program MedCalc® version 12.5.0.0 was used for statistical analysis;
- Monitoring:**
  - Intradialytic arterial hypotension
  - Interdialytic weight gain

### Definition of intradialytic hypotension:

↓ Systolic blood pressure ≥ 20 mmHg or ↓ mean blood pressure ≥ 10mmHg associated with symptoms requiring nursing or medical care (Trendelenburg, saline bolus and / or reduction of ultrafiltration)

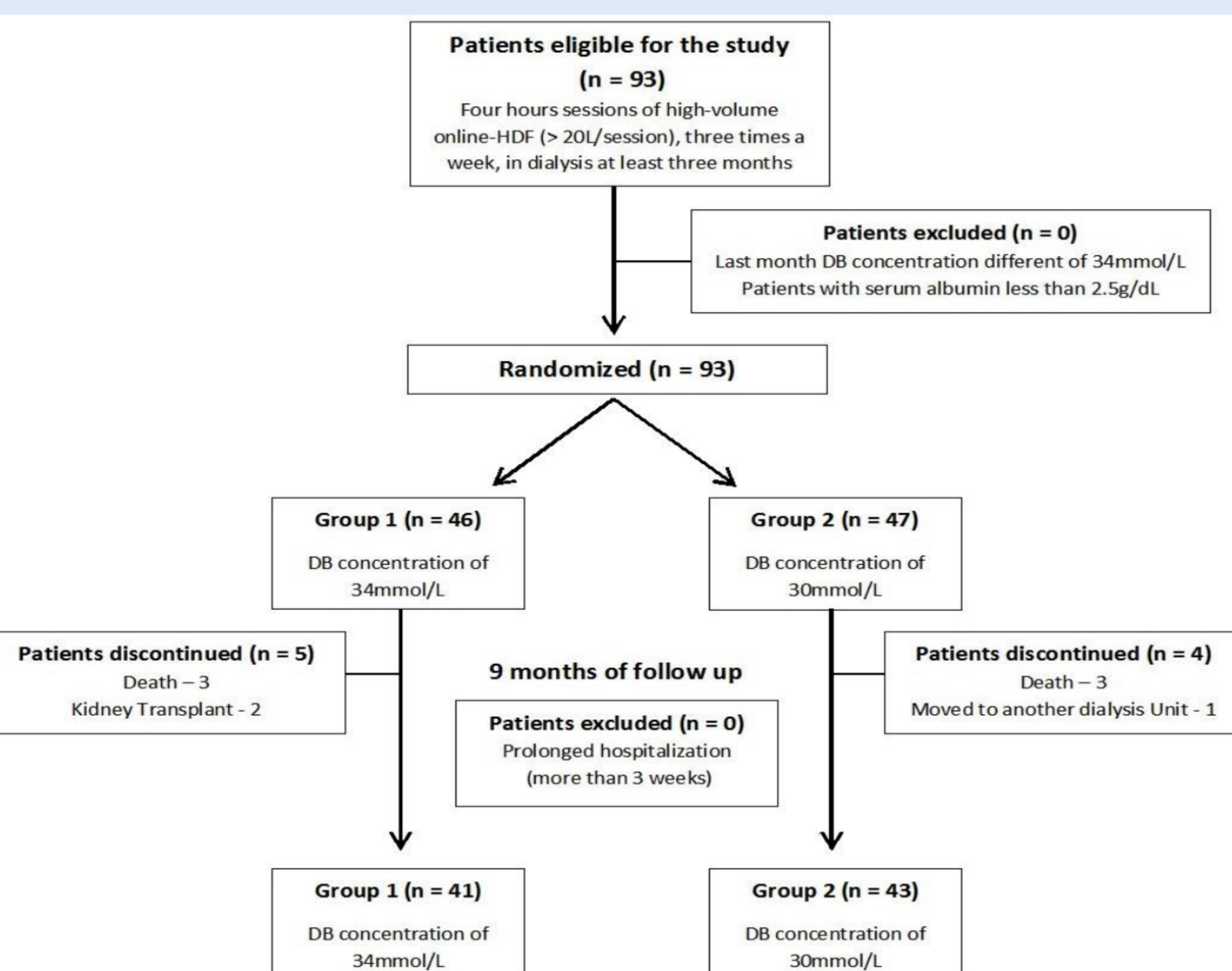


Figure 1 – Flow chart of the study design. DB – dialysate bicarbonate; HDF - Haemodiafiltration

## Results

Table 1 – Baseline characteristics

	Group 1 DB 34mmol/L	Group 2 DB 30mmol/L	P value
Patients (n)	46	47	NA
Female (%)	47,8%	40,4%	0,4868
Age (years)	61,0 (45,0; 78,0)	72,0 (61,0; 79,8)	0,0205
Time on haemodialysis (months)	40,5 (23,0; 74,0)	24,0 (15,0; 71,1)	0,1507
Age adjusted CCI	6,0 (4,0; 8,0)	6,0 (5,0; 7,8)	0,2460
eKtv	1,75 ± 0,36	1,85 ± 0,34	0,7260
Effective Infusion Volume HDF (L/session)	23,7 (21,9;25,5)	23,9 (21,6; 25,3)	0,9694
Serum albumin (g/dL)	3,9 ± 0,41	4,0 ± 0,35	0,3450
nPCR	1,10 (0,95; 1,23)	1,07 (0,93; 1,23)	0,4868
Coronary artery disease (%)	19,6%	17,0%	0,4868
Congestive heart failure (%)	17,4%	19,1%	0,8429
Peripheral vascular disease (%)	45,7%	25,5%	0,1034
Cerebrovascular disease (%)	15,2%	19,1%	0,6477
Diabetes mellitus (%)	26,1%	19,1%	0,4815
Hypertension (%)	84,8%	63,8%	0,2409
Chronic lung disease (%)	6,5%	8,5%	0,7267
Cancer (%)	0,0%	0,0%	NA
Chronic liver disease (%)	0,0%	2,1%	0,3225
Serum bicarbonate pre dialysis (mmol/L)	23,9 (22,1; 26,4)	24,6 (23,1; 26,0)	0,4045
Serum bicarbonate post dialysis (mmol/L)	2,8 (2,7; 30,4)	29,3 (28,3; 30,8)	0,1943

CCI - Charlson Comorbidity Index; HDF – Haemodiafiltration; NA – Non applicable

Table 2 – Serum Bicarbonate

	Group 1 (DB 34mmol/L)		Group 2 (DB 30mmol/L)		p value
	MEDIAN mmol/L	Q25; Q75 mmol/L	MEDIAN mmol/L	Q25; Q75 mmol/L	
Pre HDF	22,7	20,9; 24,4	21,1	19,7; 22,7	<0,001
Pos HDF	28,0	26,9; 29,1	25,3	24,0; 26,5	<0,001

Table 3 – Intradialytic hypotension and IDWG

	Grupo 1 (DB 34mmol/L)	Grupo 2 (DB 30mmol/L)	p
Total of evaluated sessions (n)	5029	5042	
Rate of intradialytic hypotension (episodes per 1000 sessions of HDF)	28,0	27,4	0,906
Interdialytic weight gain (%) (Q1;Q3)	2,9% (2,5%; 3,9%)	3,0% (2,4%; 3,8)	0,710

## Conclusion

- No significant differences in intradialytic hypotension rate and interdialytic weight gain between the groups.
- The bicarbonate dialysate, in the tested concentrations, did not appear to have a significant impact on intradialytic hemodynamics and interdialytic weight gain in chronic kidney patients in regular hemodiafiltration program.
- Limitations: study of a single center and with a small sample.
  - It is needed randomized studies with larger number of patients to evaluate the relationship between bicarbonate concentration in dialysate and hemodynamic variations.

### References:

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