

Treatment of metabolic acidosis in hemodialysis patients with reduced daily pill burden

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Background

- Metabolic acidosis in hemodialysis (HD) patients is associated with increased mortality
- Target predialysis plasma bicarbonate concentration ($[\text{HCO}_3^-]_p$) is 20-22mmol/L
- Guidelines recommend treatment with oral NaHCO_3 and/or individualized dialysate bicarbonate concentration ($[\text{HCO}_3^-]_d$)

Aim of study

- Evaluate efficacy and safety of discontinuation of oral NaHCO_3 and upward adjustment of $[\text{HCO}_3^-]_d$

Methods

- *Study population:* all HD patients treated with oral NaHCO_3 (n=19)
- *Intervention:*
 - 1) discontinuation of oral NaHCO_3 and increasing $[\text{HCO}_3^-]_d$ by 1-3mmol/L (depending on oral NaHCO_3 dose)
 - 2) weekly titration of $[\text{HCO}_3^-]_d$ targeting predialysis $[\text{HCO}_3^-]_p$ of 20-22mmol/L
- *Outcome:* pre- and postdialysis acid-base status, electrolytes and weight before and two months after implementation of the protocol

Results

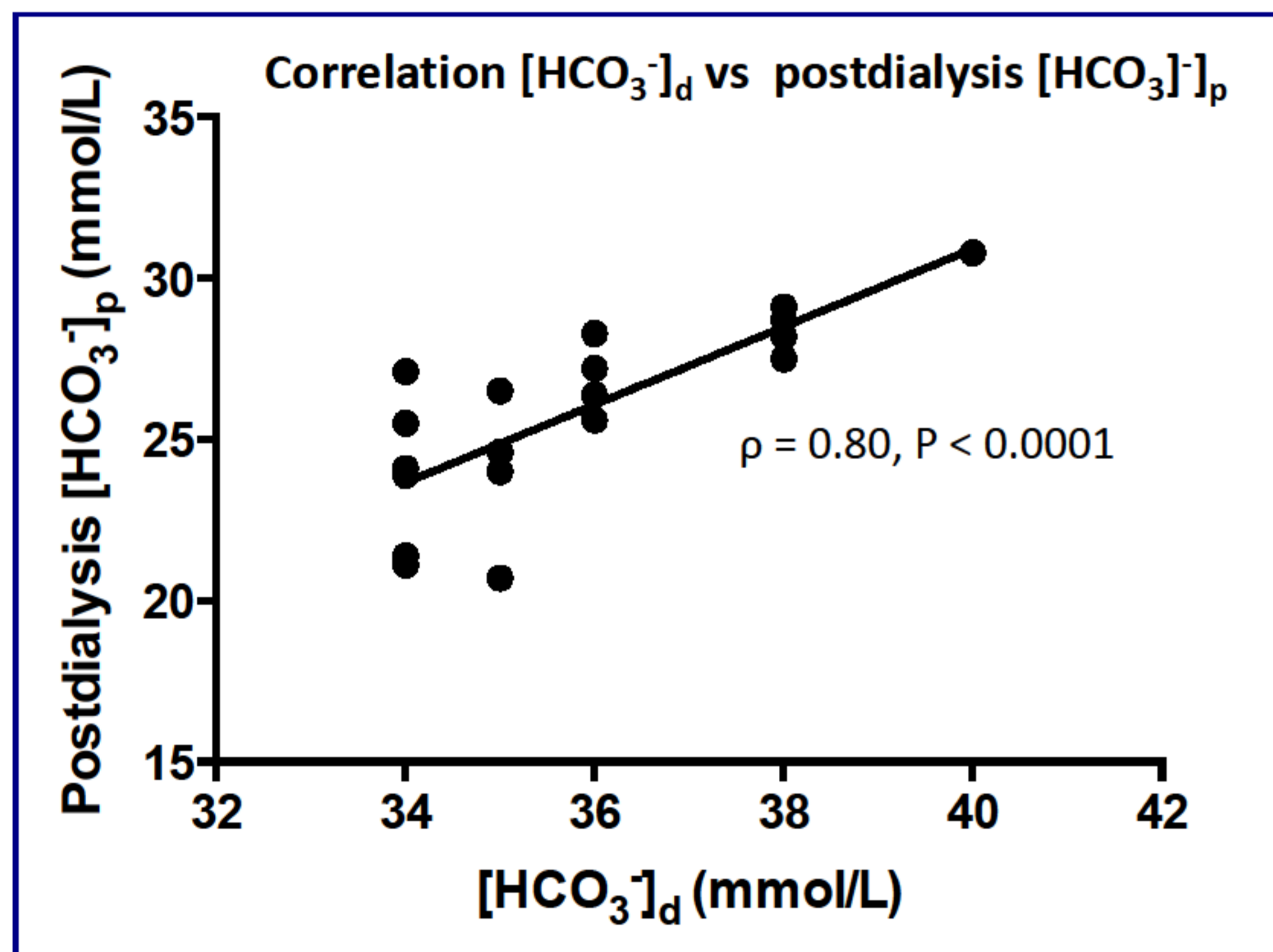


Figure 1

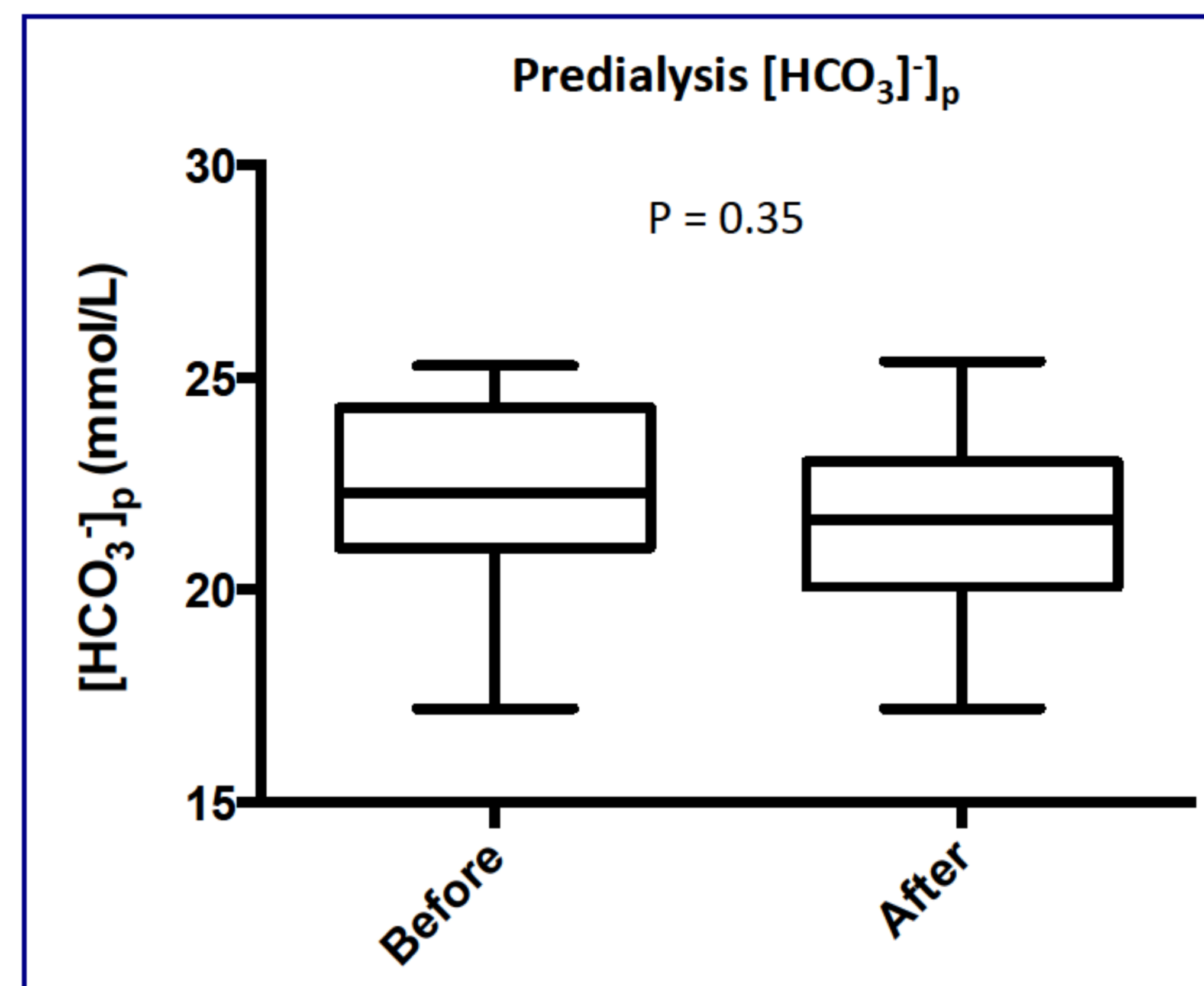


Figure 2

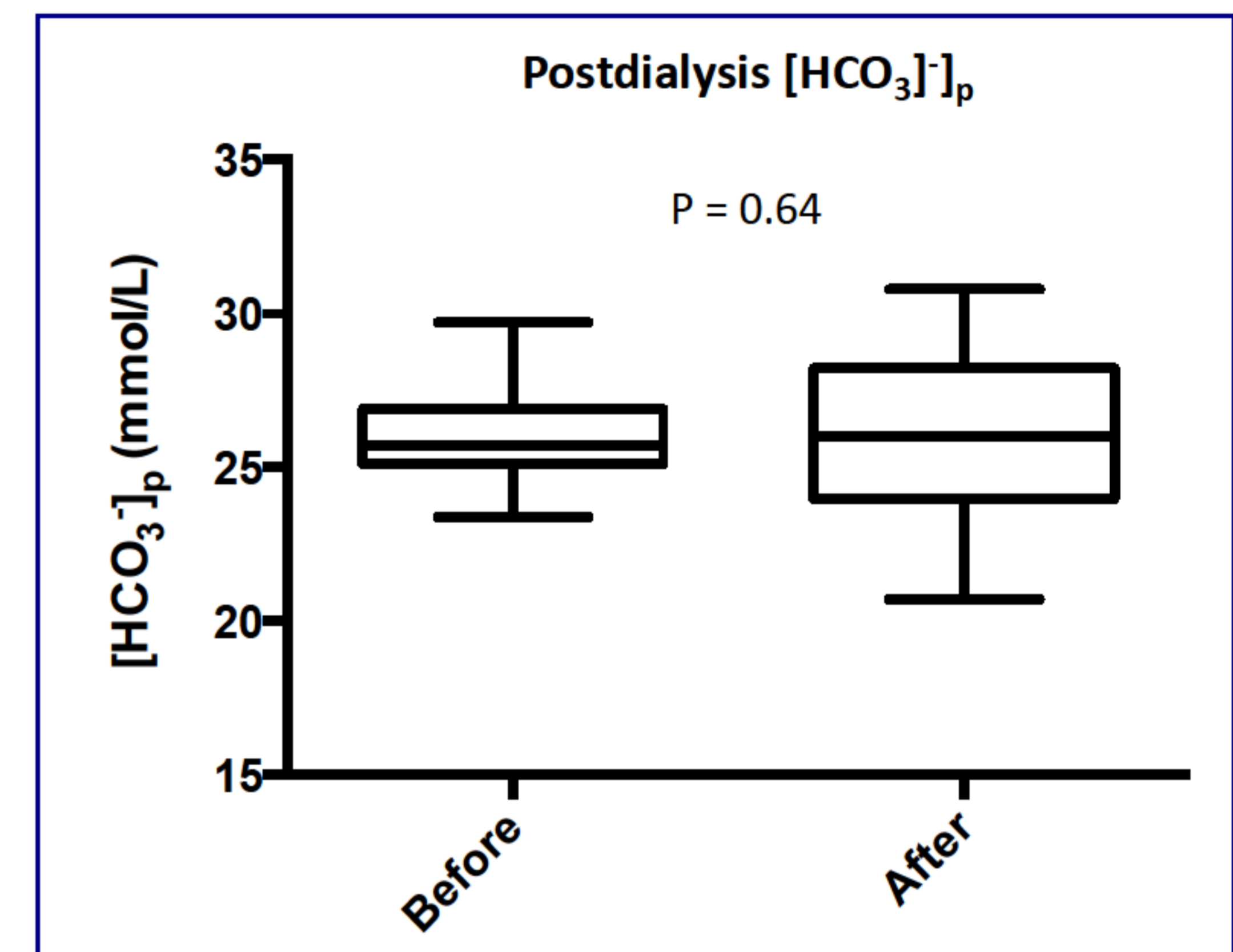


Figure 3

Table 1	Before	After	p
Dialysate bicarbonate (mmol/L)	34[34-35]	35[34-38]	0.02
Target predialysis plasma bicarbonate 20-22 mmol/L	7	8	1.00
Predialysis plasma bicarbonate ≥ 20 mmol/L	17	15	0.66
Postdialysis plasma bicarbonate > 29 mmol/L	1	2	1.00
Postdialysis			
pH	7.47[7.43-7.50]	7.49[7.45-7.50]	0.36
pCO2 (mmHg)	41[35-43]	38[37-42]	0.88
Total calcium (mmol/L)	2.59[2.48-2.62]	2.64[2.52-2.74]	0.12
Ionized calcium (mmol/L)	1.28[1.22-1.30]	1.25[1.19-1.31]	0.17
Sodium (mmol/L)	139[136-140]	139[138-141]	0.34
Potassium (mmol/L)	3.5[3.2-3.6]	3.5[3.3-3.8]	0.35
Interdialytic weight gain (kg)	1.9[1.3-3.5]	2.2[1.6-3.3]	0.73
Dosage sodium bicarbonate tablets (mg)	1500[1000-3000]	0[0-0]	< 0.0001

Values are median [interquartile range] or number

Efficacy:

- $[\text{HCO}_3^-]_d$ is positively correlated with postdialysis $[\text{HCO}_3^-]_p$ (figure 1)
- Median predialysis $[\text{HCO}_3^-]_p$ was 22.3 [21.0-24.3] mmol/L with old and 21.7 [20.1-23.0] mmol/L with new protocol (figure 2)
- Target predialysis and predialysis plasma bicarbonate was equally achieved (table 1)

Safety:

- Median postdialysis $[\text{HCO}_3^-]_p$ was 25.7 [25.1-26.7] mmol/L with old and 26 [23.9-28.2] mmol/L with new protocol (figure 3)
- Postdialysis $[\text{HCO}_3^-]_p > 29$ mmol/L was observed equally frequent (table 1)
- No differences in postdialysis electrolyte concentrations with the new protocol (table 1)

Patient friendliness/Cost efficacy:

- Daily tablet load reduction per patient: 3 [2-6]
- Increasing $[\text{HCO}_3^-]_d$ does not influence HD cost

Conclusion and perspectives

- Individualized $[\text{HCO}_3^-]_d$ seems an adequate, safe, cost effective and patient friendly alternative treatment for metabolic acidosis compared to oral NaHCO_3
- Randomized long-term studies with clinical endpoints are warranted for proper safety assessment