Effects of Cool Dialysate in Dialysis-Related Symptoms

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Dear Sir,

In a previous double-blind short-term study [1], we observed the beneficial effects of cool dialysate on hemo-dialysis-induced symptoms in a group of selected patients with frequent episodes of symptomatic hypotension (SH). Later on, those results were confirmed when using cool dialysate for a 6-month period [2]. In both studies, the reduction in the percentage of symptomatic hemodialysis and in the prevalence of SH was similar. Other authors have reported indential achievements when using a high-sodium dialysate [3–5]. Combined use of high-sodium dialysate and low temperature produced the best results. Nevertheless, the beneficial effects of low temperature were greater when using low-sodium concentration dialysate, a situation prone to the development of SH [6]. In a previous article, Kerr et al. [7] pointed out that the benefit in lowering the dialysate temperature is small in relation to the placebo effect. However, the group of patients studied were not selected by the high incidence of cardiovascular instability during hemodialysis.

Recently, we have evaluated 7,742 hemodialysis sessions performed in 60 patients (39 men and 21 women) during 12 months. The mean age of the patients was 51 years (range, 15–72 years) and all of them had been on dialysis for at least 1 year. Dialyses performed at 37 °C for 6 months (3,723 sessions) constituted the control period. Temperature was changed to 35 °C for the same length period (4,019 sessions) thereafter. Both temperature and conductivity were weekly checked by a sound thermistor and resistivimeter placed at the in-line dialysis fluid. Dialysis schedule was 3–4 h, 3 times a week, using a

Table 1. Incidence of SH and dialysate temperature

Patients
n
37 °C %
35 °C
%
P <
Men
39
10.4

6.7
0.001
< 55 years

31

10.5

7.0

0.001

SH > 30%

12

44.2

34.1

0.001

hollow-fiber cuprophane dialyzer membrane with a surface of 0.9–1.1 m². Dialysate composition was: sodium 134 mEq/l, calcium 3.25 mEq/l, magnesium 1.5 mEq/l, potassium 1 mEq/l, glucose 2.5 g/l, chloride 107 mEq/l, and acetate 32 mEq/l. The prevalence of SH in this population was 15.3%. There was a slight decrease with low-temperature dialysate (16.4 vs. 14.3%, $p < 0.01$) with almost identical loss of weight during the procedure (1.8 ± 0.6 vs. 1.9 ± 0.6 kg). The maximal improvement of hemodialysis symptoms was obtained in those patients with high incidence of SH (table 1).

Our data confirm the previous findings. The use of cool dialysate ameliorates intradialytic symptoms related to hemodialysis-induced hypotension and demonstrates a small benefit in patients without this complication. As dialysis at 37°C implies a caloric burden to the patients [8,9], we do not consider this temperature to be adequate and dialysis at 36°C has to be recommended for most of the patients.

In conclusion, lowering dialysate temperature is a simple procedure that represents an alternative in the treatment of SH in selected patients but it is not a worthwhile useful procedure in the low-symptomatic patients.

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References

- Quereda, C.; Marcen, R.; Lamas, S.; Hernandez-Jodra, M.; Orofino, L.; Sabater, J.; Villafruela, J.; Ortuño, J.: Hemodialysis associated hypotension and dialysate temperature. *Life Support Syst.* 1, suppl. 1, pp. 18–22 (1985).
- Marcen, R.; Quereda, C.; Orofino, L.; Lamas, S.; Teruel, J.L.; Matesanz, R.; Ortuño, J.: Hemodialysis with low temperature: a long-term experience. *Nephron* 49:29–32 (1988).
- Velez, R.L.; Woodard, T.D.; Henrich, W.L.: Acetate and bicarbonate hemodialysis in patients with and without autonomic dysfunction. *Kidney int.* 26:59–65 (1984).
- Bijaphala, S.; Bell, A.J.; Bennet, C.A.; Evans, S.M.; Dawborn, J.K.: Comparison of high and low sodium bicarbonate and acetate dialysis in stable chronic hemodialysis patients. *Clin. Nephrol.* 25:179–183 (1985).
- Cybulsky, A.V.E.; Matni, A.; Hollomby, D.J.: Effects of high sodium dialysate during maintenance hemodialysis. *Nephron* 47:57–61 (1985).
- Quereda, C.; Orofino, L.; Marcen, R.; Sabater, J.; Matesanz, R.; Ortuño, J.: Influence of dialysate and membrane biocompatibility on hemodynamic stability in hemodialysis. *Artif. Organs* 11: 259–264 (1988).

Kerr, P.G.; Van Bakel, C; Dawborn, J.K.: Assessment of the symptomatic benefit of cool dialysate. *Nephron* 52: 166–169 (1989).

Maggiore, Q.; Pizzarelli, F.; Sisca, S.; Catalano, C.; Delfino, D.: Vascular stability and heat in dialysis patient; in Berlyne, Gio-vannetti, *Contr. Nephrol.*, vol. 41, pp. 399–402 (Karger, Basel 1984).

Lindholm, T.; Thysell, H.; Yamamoto, Y.; Forsberg, B.; Gull-berg, C.A.: Temperature and vascular stability in hemodialysis. *Nephron* 59:130–133 (1985).