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Letter to the Editor

LETTER TO THE EDITOR

Twice-weekly hemodialysis in the time of COVID-19: a multicenter study in prevalent patients

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Patients undergoing long-term in-center hemodialysis (HD) are particularly vulnerable tocoronavirus disease 2019 (COVID-19). One option to reduce the exposure of these vulnerable patients is to lower the dialysis frequency from three to two sessions a week [1]. Recently, in a small unicenter study [2], 16 out of 48 patients (33%) were switched from three to two sessions a week. During this 6-month study, none of the twice-weekly patients presented COVID-19 disease no required hospitalization or emergency dialysis. However, the only parameter applied for selection was a required ultrafiltration rate (UFR) of <8.5 mL/kg/h. Hyperkalemia and poor nutritional status, two well-known factors that increase mortality [3], were not taken into account.

Our aim in the present multicenter study was to elaborate a practical approach to safely transfer HD patients to a short-term twice-weekly schedule.

We designed a cross-sectional, multicenter study, which was performed in accordance with the declaration of Helsinki. Demographic and laboratory data were extracted from 178 de-identified patients >18 years old, undergoing a thrice-weekly session schedule. Predialysis blood samples of the second weekly session were processed in local laboratories. Laboratory determinations were performed using automated and standardized methods. Funding was provided by each dialysis unit. Data (available on request) are reported as mean (95% confidence interval) or median (interquartile range) as appropriate.

Table 1 shows the main demographic characteristics and laboratory data of the whole sample. The prevalence of diabetes

Table 1. Demographic characteristics, nutritional status and laboratory parameters

Number of patients	This study	National Registry [4]
Number of patients	178	30 300
Women, *n* (%)	79 (43.6)	12 786 (42.1)
Age, years	58.8 (55.6–62)	57.3 (57.1–57.5)
Vintage, years	4.7 (2.8–6.6)	4.8 (4.7–4.9)
Diabetics, *n* (%)	35 (19)	8471 (28)
BMI	26 (22–30)	26.2 (26.1–26.2)
Hemoglobin, g/dL	10.3 (10.1–10.6)	10.6 (10.5–10.7)
Albumin, g/dL	4.0 (3.9–4.1)	3.738 (3.732–3.744)
GNRI [median (IQR)]	98.7 (95.4–101.3)	NA
Calcium, mg/dL	9.0 (8.9–9.1)	8.7 (8.69–8.71)
Phosphorus, mg/dL	5.5 (5.3–5.7)	5.09 (5.07–5.10)
Potassium, mEq/L	4.8 (4.7–4.9)	NA
Dry weight, median (IQR), kg	71.4 (59.8–79.2)	NA
Predialysis SBP, mmHg	135 (131–139)	129.9 (129.7–130.2)
IDWG, kg	2.1 (1.9–2.3)	2.11 (2.09–2.12)
URR, %	72.0 (67–77)	72.0 (71.9–72.1)
spK_t/V_{urea}	1.58 (1.52–1.64)	1.575 (1.57–1.58)
eK_t/V_{urea}	1.39 (1.34–1.45)	NA
nPCR, g/kg/day	1.07 (1.03–1.11)	1.105 (1.10–1.11)

Data expressed as mean (95% confidence interval) unless otherwise stated. National Registry: 2019 SAN-INCUCAI Registry Annual Report [4].
IQR, interquartile range; BMI, body mass index; GNRI, Geriatric Nutritional Risk Index [5]; SBP, systolic blood pressure; IDWG, interdialytic weight gain; URR, urea reduction rate; nPCR, normalized protein catabolic rate; NA, not available.

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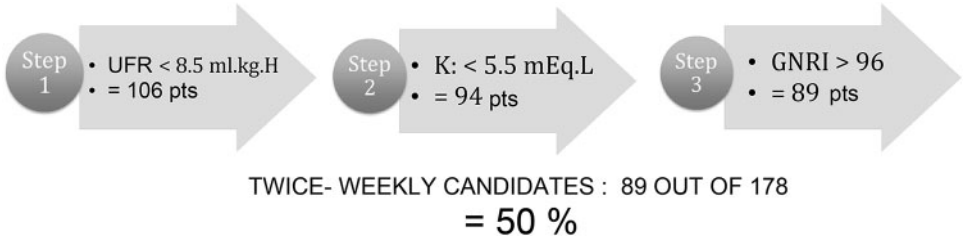

FIGURE 1: Stepwise approach to evaluate prevalent thrice-weekly HD patients (pts) for short-term twice-weekly HD. For eligibility, pts must fulfill all steps. Step 1: UFR <8.5 mL/kg/h. This selection criterion was the most selective, fulfilled (ff) by 60%, between the four options tested: Daugirdas' opinion [6]: 800 mL/h (ff by 81%); real-life trial [7]: 13 mL/kg/h (ff by 88%); Kalantar-Zadeh *et al.* [8]: (ff by 65%); and Siga *et al.* [2]: UFR <8.5 mL/kg/h. The 106 pts who fulfilled Step 1 proceeded to Step 2: serum potassium (K) <5.5 mEq/L [8] and Step 3: good nutritional status assessed by the Geriatric Nutritional Risk Index (GNRI) [5] >96. Eighty-nine out of 178 pts (50%) fulfilled the three criteria.

was lower than the national one (19% versus 28%) [4], but the other parameters did not differ from the average HD patient. Our stepwise approach to estimate the feasibility of twice-weekly HD comprised three successive steps. First, we aimed to establish a hypothetical cut-off UFR that would exclude most patients in danger of volume overload. Of the four different criteria used to estimate it (see Figure 1), a UFR of <8.5 mL/kg/h was the most selective. This criterion (fulfilled by 60% of the sample) was Step 1, potassium <5.5 mEq/L was Step 2 and nutritional state (Geriatric Nutritional Risk Index >96) was Step 3. Figure 1 shows that neither Step 2 nor Step 3 significantly decreased the number of patients suitable for twice-weekly HD sessions. Forty-two of the 89 patients selected for twice-weekly HD reported a residual diuresis of at least 200 mL/day.

The current sustained health crisis prompted us to consider different options for the care of our HD patients, while ensuring the safety of both patients and healthcare workers. The option of reducing for a short period of time from the usual thrice-weekly schedule to a twice-weekly one has been advocated by some authors [1, 2] but rejected by others [9, 10]. Our results suggest that as many as 50% of patients could be safely transferred to a twice-weekly schedule for a short period. Therefore, we considered that this approach could be implemented at least in COVID-19-positive patients during their isolation period.

It is important to emphasize that we propose implementing a twice-weekly schedule for just a short time. For this reason, we did not include dialysis adequacy parameters or residual kidney function in the stepwise approach. It could be argued that if anemia and hyperphosphatemia were included [8], the number of patients suitable for twice-weekly HD would be significantly lower. However, an increase in the erythropoietin dose and an intensive low-phosphorus diet combined with binders could deal with both conditions during the twice-weekly period.

In conclusion, we suggest that during the COVID-19 pandemic, the focus should be on reducing the exposure to the virus of in-center HD patients. This can be achieved by reducing the thrice-weekly session schedule to a twice-weekly one, provided that suitable patients are carefully selected, and as long as volume overload and hyperkalemia are avoided. The associated increased professional workload must be recognized and reimbursed accordingly.

AUTHORS' CONTRIBUTIONS

E.S. designed the study and drafted the manuscript. E.S., C.C., M.G. and A.C. collected and analyzed the data. All authors revised the final manuscript.

CONFLICT OF INTEREST STATEMENT

None of the authors had any financial or personal relations with people or organizations that could have inappropriately influenced their work. The corresponding author states that he had full access to all the data in the study and had final responsibility for the decision to submit for publication.

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