The effect of Kt/V on post dialysis urea rebound in hemodialysis and hemodiafiltration

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Objectives:

Post dialysis urea rebound (R) is a rapid increase in urea plasma concentration immediately after the completion of dialysis due to the reequilibration of urea concentrations between body compartments.

It has been shown previously that the magnitude of R is related to dialysis efficiency [1, 2]. It has also been suggested that the extent of R is a more adequate index of blood purification than only the evaluation of plasma solute levels at the end of HD [3]. The application of the optical method for the monitoring of dialysis adequacy [4] would enable reviewing Kt/V in an automatic and time-efficient manner.

The aim of the study was to investigate the effect of dialysis dose, Kt/V, and treatment modality (HD, HDF) on post dialysis urea rebound and to examine the possibility of assessing this effect also utilizing UV-absorbance measurements in spent dialysate.

Methods:

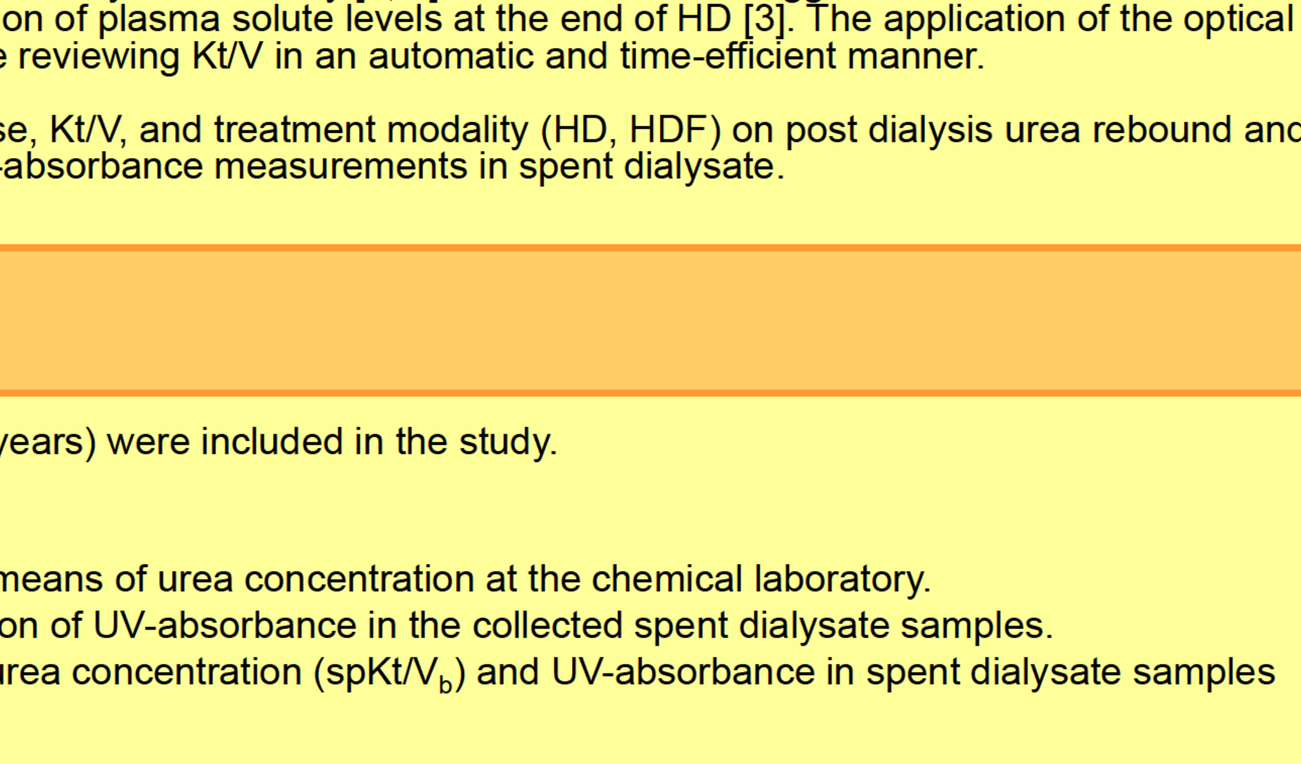
- 38 uremic patients (15 female, 23 male, mean age 59.5±13.8 years) were included in the study.
- 80 HD and 30 HDF sessions were followed.

- Blood and dialysate samples were collected and analyzed by means of urea concentration at the chemical laboratory.
- Double-beam spectrophotometer was used for the determination of UV-absorbance in the collected spent dialysate samples.
- The single-pool Kt/V (spKt/V) was calculated based on blood urea concentration ($spKt/V_b$) and UV-absorbance in spent dialysate samples ($spKt/V_a$).
- R was calculated based on blood urea concentration.
- Linear regression was used to analyze the relationship between spKt/V and R. Blood flow rate (Q_b), dialysate flow rate (Q_d), body weight after dialysis (BW_{post}) and total ultrafiltration (UF_{tot}) were also included in the analysis.
- Student's t-test for dependent samples was used to compare means for different methods, $p<0.05$ was considered significant.

Results:

In case of HD:
- Average $spKt/V_b$ (mean±SD) was 1.47±0.32 (N=80).
- Average $spKt/V_a$ was 1.38±0.31 (N=80), which was significantly lower compared to $spKt/V_b$ ($p<0.05$).

In case of HDF:
- Average $spKt/V_b$ was 1.51±0.43 (N=30).
- Average $spKt/V_a$ was 1.45±0.44 (N=30), which was not statistically different from $spKt/V_b$ ($p=0.26$).



Conclusions:

The results suggest that post dialysis urea rebound is influenced by $spKt/V_b$ and the treatment modality (HD, HDF), which is in compliance with previous results [1, 2, 3].
The results also indicate that the same relationship can be seen in case of $spKt/V_a$ calculated based on UV-absorbance measurements in spent dialysate, provided blood flow rate, total ultrafiltration and body weight after dialysis are also taken into account. The merits of the method utilizing UV-absorbance are that it does not need blood samples and trends can be easily monitored.

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