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Leypoldt JK. Urea standard Kt/V for assessing dialysis treatment adequacy. *Hemodialysis International* 2004;8:193-7.

Urea standard Kt/V urea ($\text{stdKt}/V_{\text{urea}}$) has been proposed as a dose measure to assess the adequacy of dialysis treatments of arbitrary length and frequency. It is based on two fundamental assumptions: 1) that clinical outcomes for hemodialysis and peritoneal dialysis patients are equivalent and 2) that the equivalency of such clinical outcomes is achieved when the mean predialysis blood urea nitrogen or urea concentration is identical for both therapies. The relationships among urea $\text{stdKt}/V_{\text{urea}}$, equilibrated $\text{Kt}/V_{\text{urea}}$, and single-pool Kt/V urea are reviewed, and the assumptions required for the validity of urea $\text{stdKt}/V_{\text{urea}}$ as a universal dose measure to describe dialysis treatment adequacy are discussed. It is proposed that urea $\text{stdKt}/V_{\text{urea}}$ is a dose measure for both water-soluble and protein-bound toxin clearances; therefore, this parameter may be a practical dose measure for assessing the adequacy of dialysis during treatments of arbitrary length and frequency.

Commentary by Todd S. Ing, MD

Dr. Leypoldt asserts in the present communication that the standard $\text{Kt}/V_{\text{urea}}$ concept is based on the hypothesis that equal peak or predialysis concentrations of a water-soluble uremic toxin in blood, such as urea, predict equivalent overall patient outcomes. Indeed, this standard Kt/V value, the brainchild of Gotch (1, 2), may serve as a universal dose gauge for hemodialysis therapies of arbitrary length and frequency. Formulas and nomograms depicting the relationship between the single-pool Kt/V per treatment and the weekly standard Kt/V for various treatment durations and different treatment frequencies have been reported (1, 3, 4). In the instance of 6 times per week, short daily hemodialysis therapy, the minimum per-session, single-pool Kt/V corresponding to a weekly standard Kt/V of approximately 2.0 (for patients with a residual renal function of less than 2 mL/min/1.73 square meters surface area) has been suggested by Kidney Disease Outcomes Quality Initiative (KDOQI) to be 0.5 (5). [It is noteworthy that a weekly standard Kt/V value of 2.1 is closely equivalent to that dialysis dose provided by 3 conventional, thrice weekly (e.g., 3.5 hours per session) hemodialysis treatments with a single-pool Kt/V level of 1.2 each (1)]. Future studies are required to determine if this novel standard Kt/V concept is the dialysis adequacy measure of choice.

References:

1. Gotch FA. The current place of urea kinetic modeling with respect to different dialysis modalities. *Nephrol Dial Transplant* 1998;13 (Suppl 6):S10-4.
2. Gotch FA. Modeling the dose of home dialysis. *Home Hemodial Int* 1999;3:37-40.
3. Leypoldt JK, Jaber BL, Zimmerman DL. Predicting treatment dose for novel therapies using urea standard Kt/V. *Semin Dial* 2004;17:142-5.
4. Leypoldt JK, Jaber BL, Zimmerman DL. Calculation of standard Kt/V (stdKt/V) with corrections for postdialysis urea rebound (abstract). *Hemodial Int* 2003;7:80.
5. Clinical practice recommendations for guideline 4: Minimally adequate hemodialysis. National Kidney Foundation KDOQI clinical practice guidelines and clinical practice recommendations. 2006 updates. Hemodialysis adequacy. *Am J Kidney Dis* 2006;48 (Suppl 1):S53-62 (Table 13).