

Association between Time-Averaged (Cumulative) Hemodialysis Dose and 5-Year Survival CKD Patients

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Background

- The cumulative effect of dialysis dose on survival of maintenance hemodialysis (MHD) patients is not known.
- We hypothesized that higher time-averaged hemodialysis (HD) dose is associated with better survival independent of body mass or dialysis time.

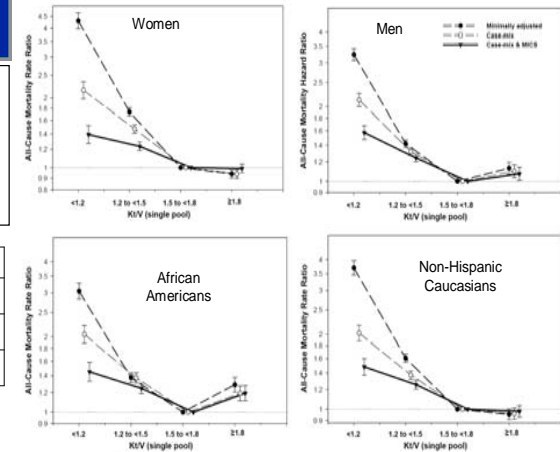
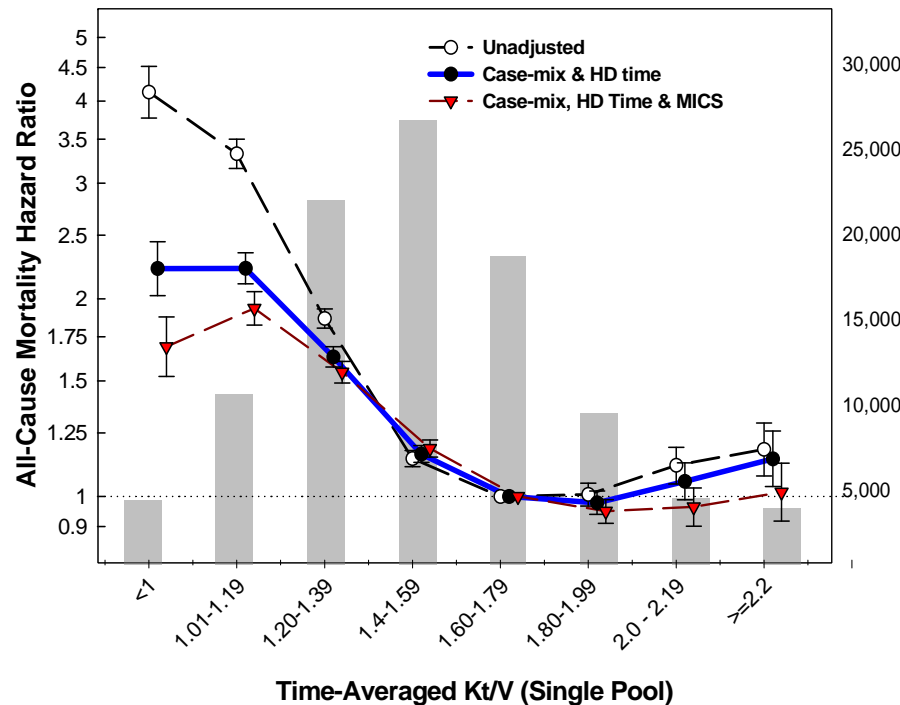
Methods

- We averaged all monthly Kt/V (achieved, single pool) values in 88,153 MHD patients whose all monthly Kt/V were between 0.5 and 5.0 (to exclude outliers) who underwent dialysis treatment for at least 3 months from all Legacy DaVita dialysis clinics over a period of 5 years (July 2001 to June 2006).
- Analytical Method: Cox survival modeling
- The death hazard ratio (and 95% CI) of the time-averaged (cumulative) dialysis dose were calculated at 3 levels of multivariate adjustments:
 - Unadjusted
 - Case-mix adjusted: Demographics (age, gender, race/ethnicity, diabetes, vintage, insurance, marital status), KRU
 - Malnutrition-inflammation complex syndrome (MICS) adjusted: BMI and blood/serum levels of creatinine, albumin, hemoglobin, WBC, ferritin, TIBC, lymphocyte%, calcium, phosphorus & bicarbonate, and HD Rx time

Results

- An incrementally higher death risk was noted with each 0.1 unit decline in time-averaged Kt/V: fully adjusted death hazard ratio (HR): 1.16 (95% CI: 1.14-1.18).
- Cumulative Kt/V values below 1.5 (ref: 1.5-1.8) were associated with increased mortality, but Kt/V values above 1.8 did not appear to offer additional survival advantages (see Table). Smaller Kt/V increments (0.2) confirmed these data (see Figure):

Death HR (95% CI)	Kt/V < 1.2	1.20 to < 1.5	1.5 to < 1.8	≥ 1.8
Unadjusted HR	3.37 (3.23-3.53)	1.48 (1.44-1.52)	1.00 (ref.)	1.02 (0.98-1.05)
Case-mix adjusted HR	2.11 (2.01-2.22)	1.37 (1.33-1.41)	1.00 (ref.)	0.97 (0.94-1.01)
+ MICS adjusted HR	1.49 (1.41-1.57)	1.24 (1.21-1.28)	1.00 (ref.)	1.01 (0.97-1.04)



Conclusions

In a large contemporary cohort of 88,153 MHD patients, if the average of all monthly achieved Kt/V values is below 1.5, there appears to be an association with at least 30% increased death risk compared to higher cumulative Kt/V values even after adjustment for demographics and surrogates of nutrition and inflammation.

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