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Does universal Kt/V target work for all? Gender-specific approach to find the optimal dialysis adequacy: A Korean nationwide cohort study

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Objectives : Clinical guidelines recommend a single-pool Kt/V of 1.2–1.4 per session, but gender-specific target values remain undefined. This study evaluated the association between Kt/V and mortality in Korean maintenance hemodialysis (HD) patients.
Methods : We used HD Quality Assessment and National Health Insurance Service claims data from October through December 2015. A total of 29,349 patients who participated in the 2015 HD Quality Assessment were included in the study. Patients were categorized by Kt/V: <1.2, 1.2-1.4, 1.4-1.7, and ≥1.7. The association between Kt/V and all-cause mortality was assessed using a Cox proportional hazards model. In the Cox analysis, the Kt/V range of 1.2–1.4 was defined as the reference group.
Results : Among the total patients, 17,171 (58.5%) were male, and 9,178 (41.5%) were female. The mean follow-up period was 53.8±23.0 months. The mean Kt/V was 1.44±0.22 in men and 1.71±0.27 in women. Higher Kt/V was associated with reduced mortality, with a greater effect in women (hazard ratio [HR] 0.66, 95% confidence interval [CI] 0.58-0.75 per 0.1 Kt/V) than in men (HR 0.80, 95% CI 0.70-0.90 per 0.1 Kt/V). In male, a Kt/V <1.2 was associated with an increased mortality (HR 1.25, 95% CI 1.14-1.37) compared to the reference group, whereas no significant difference in mortality was observed for Kt/V ≥1.4. In female, a Kt/V ≥1.4 was associated with a lower mortality (1.4-1.7, HR 0.86, 95% CI 0.78-0.96; ≥1.7, HR 0.73, 95% CI 0.65-0.82) compared to the reference group, while no significant difference in mortality was observed for Kt/V <1.2.
Conclusions : The study found that a Kt/V ≥1.2 was associated with improved survival in men, and a Kt/V ≥1.4 was associated with better survival in women. This study provides real-world evidence that the optimal Kt/V varies based on gender. Further research is needed to elucidate the rationale for gender-specific Kt/V targets.

Figure1_KtV_Male_mortality.png

Table 1. Relative risk of mortality and Kt/V in male patients

	Unadjusted		Model 1*		Model 2†		Model 3‡	
	HR (95% CI)	*P* value	HR (95% CI)	*P* value	HR (95% CI)	*P* value	HR (95% CI)	*P* value
< 1.2	1.08 (0.99~1.18)	0.086	1.26 (1.15~1.38)	<0.001	1.28 (1.17~1.40)	<0.001	1.25 (1.14~1.37)	<0.001
1.2-1.4	Reference		Reference		Reference		Reference	
1.4-1.7	1.12 (1.06~1.18)	<0.001	0.95 (0.90~1.01)	0.079	0.96 (0.90~1.01)	0.128	0.96 (0.91~1.02)	0.209
≥ 1.7	1.20 (1.10~1.31)	<0.001	0.960 (0.88~1.05)	0.366	0.98 (0.90~1.07)	0.673	0.99 (0.91~1.08)	0.852

*Model 1: adjusted age, sex, dialysis vintage, and body mass index

†Model 2: adjusted Model 1 + history of diabetes mellitus, ischemic heart disease, heart failure, cerebrovascular accident, and atrial fibrillation

‡Model 3: adjusted Model 2 + plasma hemoglobin, serum albumin, calcium, phosphorus, and single pool Kt/V

CI, confidence interval; HD, hemodialysis; HR, hazard ratio.

Figure1_KtV_Male_mortality.png

Table 2. Relative risk of mortality and Kt/V in female patients

	Unadjusted		Model 1*		Model 2†		Model 3‡	
	HR (95% CI)	*P* value	HR (95% CI)	*P* value	HR (95% CI)	*P* value	HR (95% CI)	*P* value
< 1.2	1.05 (0.83~1.34)	0.663	1.08 (0.85~1.37)	0.520	1.04 (0.82~1.32)	0.723	0.99 (0.78~1.26)	0.957
1.2-1.4	Reference		Reference		Reference		Reference	
1.4-1.7	0.88 (0.79~0.98)	0.021	0.86 (0.77~0.95)	0.005	0.85 (0.76~0.95)	0.003	0.86 (0.78~0.96)	0.008
≥ 1.7	0.80 (0.72~0.89)	<0.001	0.697 (0.62~0.78)	<0.001	0.72 (0.65~0.81)	<0.001	0.73 (0.65~0.82)	<0.001

*Model 1: adjusted age, sex, dialysis vintage, and body mass index

†Model 2: adjusted Model 1 + history of diabetes mellitus, ischemic heart disease, heart failure, cerebrovascular accident, and atrial fibrillation

‡Model 3: adjusted Model 2 + plasma hemoglobin, serum albumin, calcium, phosphorus, and single pool Kt/V

CI, confidence interval; HD, hemodialysis; HR, hazard ratio.