

ASN 36th Annual Meeting & Scientific Exposition

Filename: 550860

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Potential Conflict of Interest: Yes,

Grants/Research Support: Minneapolis Medical Research Foundation and Amgen Inc.

Abstract Category: 204 Dialysis: Epidemiology, Outcomes, Health Services Research

Entities that provided funding for this abstract:

Pharmaceutical Company Support

Private Foundation Support

Sponsor: Allan Collins

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Keywords:

Hematocrit; Mortality Risk; Elderly

Title: Effect of Patterns of Change in Hematocrit on Mortality

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Abstract:

We evaluated the association of mortality with various patterns of change in hematocrit (Hct) levels during the first 6 months beyond the onset of ESRD. The cohort consisted of hemodialysis (HD) patients ($n = 160,708$) who became incident between 1995 and 2000, were at least 67 years of age at the time of incidence, survived through a 3-month entry period following incidence, and possessed Hct measurements from CMS Form 2728 and ≥ 1 EPO claim during the entry period. From these ≥ 2 Hct measurements, a time series of 7 Hct measurements, corresponding to Hct at incidence, at 2 weeks (wk), at 4 wk, and so on, to at 12 wk, was created via multiple imputation, which adjusted for age, ethnicity, gender, race, total inpatient days during the 2 years preceding incidence, and indications of claims for home oxygen, walkers, and wheelchairs also during the 2 years preceding incidence. Piecewise linear regression was then used to calculate the rates of change of Hct during the first 6 weeks of HD, and during the second 6 weeks of HD. Rates of change for each 6-week interval were defined as falling (< -1.25 Hct / month), constant ($-1.25 < \text{Hct / month} < 1.25$), or rising (> 1.25 Hct / month). Nine interaction groups were formed from these categories, and those patients who exhibited a constant rate of change of Hct during both the first 6 wk and the second 6 wk of HD served as the reference group. Patient survival was evaluated via Cox regression, which adjusted for the same covariates as in multiple imputation. Patients were followed until the earliest instance of a change in modality, death, or December 31, 2000.

1 st Hct Rate	2 nd Hct Rate		
	Falling	Constant	Rising
Falling	1.17**	1.12**	1.06*
Constant	1.05	1.00	0.94*
Rising	0.89**	0.87**	0.83**

* p -value < 0.05 ; ** p -value < 0.01

As each row and column of the table indicates, rising hematocrit was associated with decreased risk of death. In particular, regardless of the rate of change in Hct during the second 6 wk, rising Hct during the first 6 wk of HD was associated with significantly ($p < 0.05$) lower risk of death, relative to the reference group. We conclude that raising Hct immediately after incidence may be strongly associated with long-term survival.