

# Patterns of Anemia Management in the Predialysis Period

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## Introduction

- Anemia is associated with mortality in patients receiving maintenance dialysis.
- The period immediately after hemodialysis (HD) initiation, which is associated with high rates of mortality and substantial economic costs, is often characterized by efforts to increase low hemoglobin (Hb) levels that developed during the predialysis period.
- However, is not fully understood how effectively anemia is managed in the predialysis period.
- In particular, how anemic patients may respond to erythropoiesis stimulating agents (ESAs) prior to dialysis initiation is understudied.
- We examined ESA administration and associated Hb levels in the period before and after initiation of HD, focusing on potentially “undertreated” individuals.

## Methods

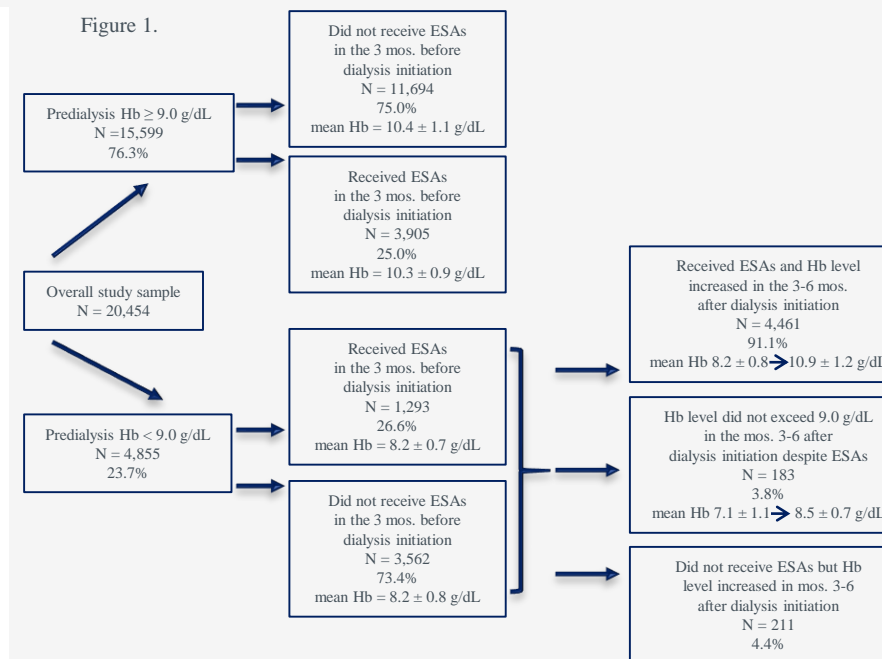
- USRDS ESRD and pre-ESRD standard analytical files for patients initiating HD between 4/1/12 and 6/30/13 were used.
- The dates were selected since they occurred after CMS revised the Prospective Payment System (January 2011) and the Food and Drug Administration changed the ESA label (June 2011). In April 2012, CMS began requiring the reporting of Hb levels for all HD patients via CROWNWeb.
- Patients were required to have/be
  - Continuous Medicare Parts A and B insurance (with no enrollment in a HMO) during the 6-month baseline period;
  - Alive on HD on the first day of the follow-up period (which began 90 days after HD initiation);
  - Survived an additional 3 months;
  - $\geq 1$  Hb measurement in the month of HD initiation or a Hb value recorded on the Medical Evidence Report upon HD initiation;
  - $\geq 2$  Hb measurements in the 3 months immediately after HD initiation;
  - Aged 66 years or older at initiation (to permit ascertainment of Medicare claims in the pre-dialysis period).
- Patients who had a blood transfusion during the baseline period were excluded
- We grouped patients into 4 major groups
  - Those with predialysis Hb  $\geq 9$  g/dL who did not receive ESAs in the 3 months before dialysis initiation
  - Those with predialysis Hb  $\geq 9$  g/dL who did receive ESAs in the 3 months before dialysis initiation
  - Those with predialysis Hb  $< 9$  g/dL who did not receive ESAs in the 3 months before dialysis initiation
  - Those with predialysis Hb  $\geq 9$  g/dL who did receive ESAs in the 3 months before dialysis initiation

## Results

Table 1. Baseline characteristics and comorbidity by initial Hb value

	Initial Hb $\geq 9$	Initial Hb $< 9$	P
<b>n</b>	15,599	4,855	
Mean age (SD)	76.78 (6.78)	76.22 (6.71)	$< 0.0001$
Age group, yrs.			$< 0.0001$
66-69	19.71	22.66	
70-74	24.53	24.80	
75-79	23.10	23.05	
$\geq 80$	32.66	29.50	
Sex			0.0003
Male	55.31	52.32	
Female	44.69	47.68	
Race			$< 0.0001$
White	77.27	69.27	
Black	17.91	25.17	
Other	4.82	5.56	
Primary cause of ESRD			0.2216
Diabetes	44.38	44.24	
Hypertension	37.62	36.52	
Glomerulonephritis	4.50	4.90	
Other	13.50	14.34	
Mean days of total hospitalizations (SD) during baseline	12.95 (16.78)	14.56 (18.90)	$< 0.0001$
Length of total hospitalizations during baseline			0.1664
0	27.71	26.41	
1-3	6.48	6.34	
$> 3$	65.81	67.25	
Comorbid conditions			
Diabetes	71.31	71.76	0.5455
ASHD	63.99	60.12	$< 0.0001$
CHF	67.29	64.84	0.0015
CVA/TIA	26.80	27.04	0.7338
PVD	46.47	46.76	0.7281
Dysrhythmia	49.00	46.36	0.0014
Cardiac (other)	53.20	51.88	0.1083
COPD	37.78	36.97	0.3113
GI	10.13	13.20	$< 0.0001$
Liver disease	7.82	8.90	0.0162
Cancer	17.77	19.42	0.0091

Figure 1.



- 76.3 % had predialysis Hb levels  $\geq 9.0$  g/dL, 25.0% of whom were treated were ESAs predialysis
- 23.7 % had predialysis Hb levels  $< 9.0$  g/dL, of whom only 26.6% received ESAs predialysis
  - ESA-treated mean predialysis Hb level:  $8.2 \pm 0.7$  g/dL
  - Non-ESA-treated mean predialysis Hb level:  $8.2 \pm 0.8$  g/dL
- Of patients with predialysis Hb levels  $< 9.0$  g/dL, 91.9% received ESAs post-initiation, with a mean increase in Hb from  $8.2 \pm 0.8$  to  $10.9 \pm 1.2$  g/dL

## Conclusions

- Overall, about one-quarter of patients who initiated HD had a predialysis Hb level  $< 9.0$  g/dL.
- Of these with Hb levels  $< 9.0$  g/dL, only one-quarter received predialysis ESAs.
- Over 9 in 10 patients with low pre-dialysis Hb levels proved responsive to ESAs after HD initiation (with Hb levels increasing, on average, from 8.2 to 10.9 g/dL).
- Many untreated patients later proved to be treatment responsive after HD initiation, suggesting possible under-treatment of anemia in the predialysis period - a critically important finding given the association of anemia with mortality in dialysis patients.



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