



Pre-ESRD erythropoietin treatment & associated hospitalization & mortality outcomes after dialysis initiation

Introduction

- Prior studies have shown the association between treatment with erythropoietin (EPO) and improved outcomes after initiation (Fink et al, 2001; Xue et al, 2002).
- Few studies have analyzed the consistency of EPO treatment during the post-K/DOQI clinical practice guideline period (1998-present).
- In the analysis of EPO treatment and outcomes, confounding may be an issue :
 - Providers that address anemia management may deliver more comprehensive treatment of other conditions improving overall outcomes and lowering mortality rates.
 - EPO treatment may be confounded by indication in that more complex patients receive treatment.
- The study objective was to show the adjusted relative risk of mortality and first hospital admission in the first year following the initiation of dialysis, by consistency of pre-ESRD EPO treatment.

Methods

- The study cohort included incident Medicare patients ≥67 years old, who initiated dialysis between January 1, 2000, and June 30, 2003 (N=97,323).

- Patients with chemotherapy or radiation for cancer were excluded.
- Only patients with Medicare as a primary payor (MPP) were included, and to ensure MPP status, patients without any claims during the two years prior to initiation were excluded.
- Outcomes included mortality and first hospital admission in the first year after initiation of dialysis:
 - Hospitalization data were obtained from the Medicare institutional inpatient claims, and death data were obtained from the Death Notification Form (2746).
 - For mortality, the 1-year follow-up period extended from months 1 to 12 after dialysis initiation. For first hospitalization, the follow-up period extended from months 2 to 13, to avoid the hospitalization that spans the date of initiation for many patients.
- Part B physician/supplier and Part A outpatient data provided EPO claims, and hemoglobin values at initiation were obtained from the Medical Evidence Form.
- Comorbidities were identified by 1+ inpatient/home health/skilled nursing claim or 2+ outpatient/part B claims, using ICD-9-CM diagnosis codes during the first of the two years before initiation.
- Consistency groups were based on the

- percentage of months with EPO after the first dose in the year before dialysis initiation as follows: No EPO; least consistent, 25%; inconsistent, >25 to 50%; more consistent, >50 to 75%; most consistent, >75%.
- Interval Poisson regression models adjusted for demographics, primary ESRD diagnosis, incident year, severity of disease measures, other anemia treatments, fistula creation, and comorbidities.

Results

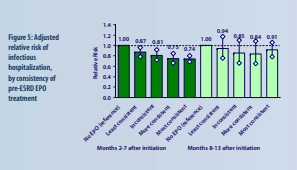
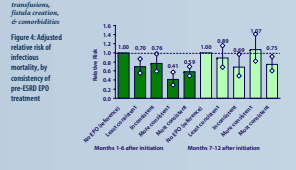
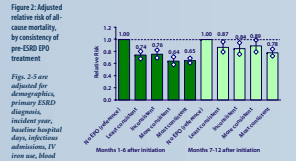
- Overall, 72% of patients had a hemoglobin level <11 g/dL at dialysis initiation, but only 17% received EPO in the year before initiation (Tables 1 & 2).
- Increasing consistency of pre-ESRD EPO was generally associated with lower percentages of patients with hemoglobin <11 g/dL at dialysis initiation (from 73% for no EPO to 65-67% for the more and most consistent groups, Table 2).
- Patients subsequently treated with pre-ESRD EPO had generally higher percentages with baseline comorbidities than those who were untreated (Figure 1).
- Compared to no EPO, treatment was associated with significantly lower mortality and first hospital admission after dialysis initiation (in first 6-month interval, P<0.0001 for all-cause, Figs. 2-3; P<0.05 for infectious, Figs. 4-5).

Table 1: Patient characteristics, by EPO treatment in the year prior to ESRD initiation

Characteristic	Without EPO (N=40,601)	With EPO (N=14,722)
Age (yr at initiation)	67.49	14.8
70-74	27.5	27.5
75-79	27.7	28.0
80-84	19.3	19.1
85+	10.8	10.0
Gender	48.2	47.4
male	74.2	77.6
white	20.9	18.9
black	3.2	2.7
Asian	1.8	0.9
other	8.5	6.4
Ethnicity	43.9	43.9
Hispanic	36.5	35.5
Primary ESRD diagnosis	5.5	7.3
diabetes	16.1	13.4
glomerulonephritis	61.6	57.6
other	1.4	1.2
Pre-ESRD hospital days	5-14	15.9
15-30	19.3	9.7
>30	92.6	92.7
Infectious hospital admissions	1	6.4
6.4	1.0	
Anemia treatments	24	1.8
intravenous iron	1.2	6.8
blood transfusions	22.8	28.9
fistula creation	11.6	27.4

Table 2: Distribution of patients by hemoglobin level at dialysis initiation and by consistency of pre-ESRD EPO

Consistency	Initial Hemoglobin (g/dL)			
	<11	11-11.5	12-12.5	12.5+
All patients	67,804	63,159	71.9	18,084
No EPO	72,776	52,979	72.8	14,328
Least consistent	3,248	2,317	71.3	707
More consistent	2,560	1,720	67.2	616
Most consistent	2,480	1,622	65.4	648



- Among patients with pre-ESRD EPO, only select differences in outcomes among consistency groups were significant: inconsistently treated patients had higher all-cause and infectious mortality, respectively, compared to most and more consistent (P<0.05, Figures 2 & 4).

Conclusions

- Treatment with EPO prior to dialysis initiation was associated with lower all-cause mortality and hospitalization in the first 6 months after initiation than no treatment.
- Associations between increased EPO consistency and lower outcomes were observed for some groups.
- Analyses adjusted for baseline comorbidities to address potential confounding by indication.
 - However, data are observational, and the influence of unmeasured confounding cannot be ruled out.
- While most patients had an initial hemoglobin level below the K/DOQI target range, only 17% of patients were treated with pre-ESRD EPO, suggesting a need for improved pre-ESRD care.