

Increases in Erythropoiesis-Stimulating Agent Use After Hospitalization of End-Stage Renal Disease Patients

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Introduction

- Hemodialysis patients are frequently hospitalized, with a national mean of 1.9 hospitalizations per patient-year in 2009 according to the USRDS 2011 Annual Data Report.¹
- In 2009, 36% of hospitalizations in hemodialysis patients were followed by another hospitalization within 30 days.¹ Post-hospitalization anemia control has been shown to reduce re-hospitalization rates.²
- A combination of the reason for hospitalization and an interruption of normal dialysis treatment leads to lowered hemoglobin levels and increased utilization of erythropoiesis-stimulating agents (ESAs) in the post-hospitalization period.³
- Solid et al. found that Hb levels take 2 months to recover to pre-hospitalization levels and that optimum ESA usage over this time period has yet to be determined.⁴ Brophy et al. confirmed that < 20% of dialysis patients receive any ESA dose while hospitalized.⁵

Objective

We have carried out a retrospective analysis to assess changes in Hb levels and ESA utilization in end-stage renal disease patients post-hospitalization.

Methods

- Data from adult (> 18 years old) hemodialysis patients receiving in-center dialysis ≥ 3 times/week between January 1, 2009 and December 31, 2010 were assessed.
- Data analysis was restricted to hospitalizations that occurred ≥ 30 days after a previous hospitalization discharge.
- Mean ESA dose and Mean Hb levels for the 30 days before and 30 days after hospitalization were assessed.
- Patients who experienced a mean rise in ESA dose in the 30 days after hospitalization were assessed to determine whether such changes were:
- Presumptive dose increase was observed before the first post-hospitalization Hb test result was known, or
- Responsive dose increase occurred on or after the date the first post-hospitalization Hb test result was known.

Results

Table 1. Summary Statistics: Hospitalizations

	Mean ± SD
Patients	138,762
Hospitalizations	289,042
Length of stay (days)	
Mean ± SD	7.76 ± 10.36
Median	5
Time between hospitalizations (days)	
Mean ± SD	74.1 ± 96.7
Median	37

Table 2. Hemoglobin Levels Pre- and Post-Hospitalization

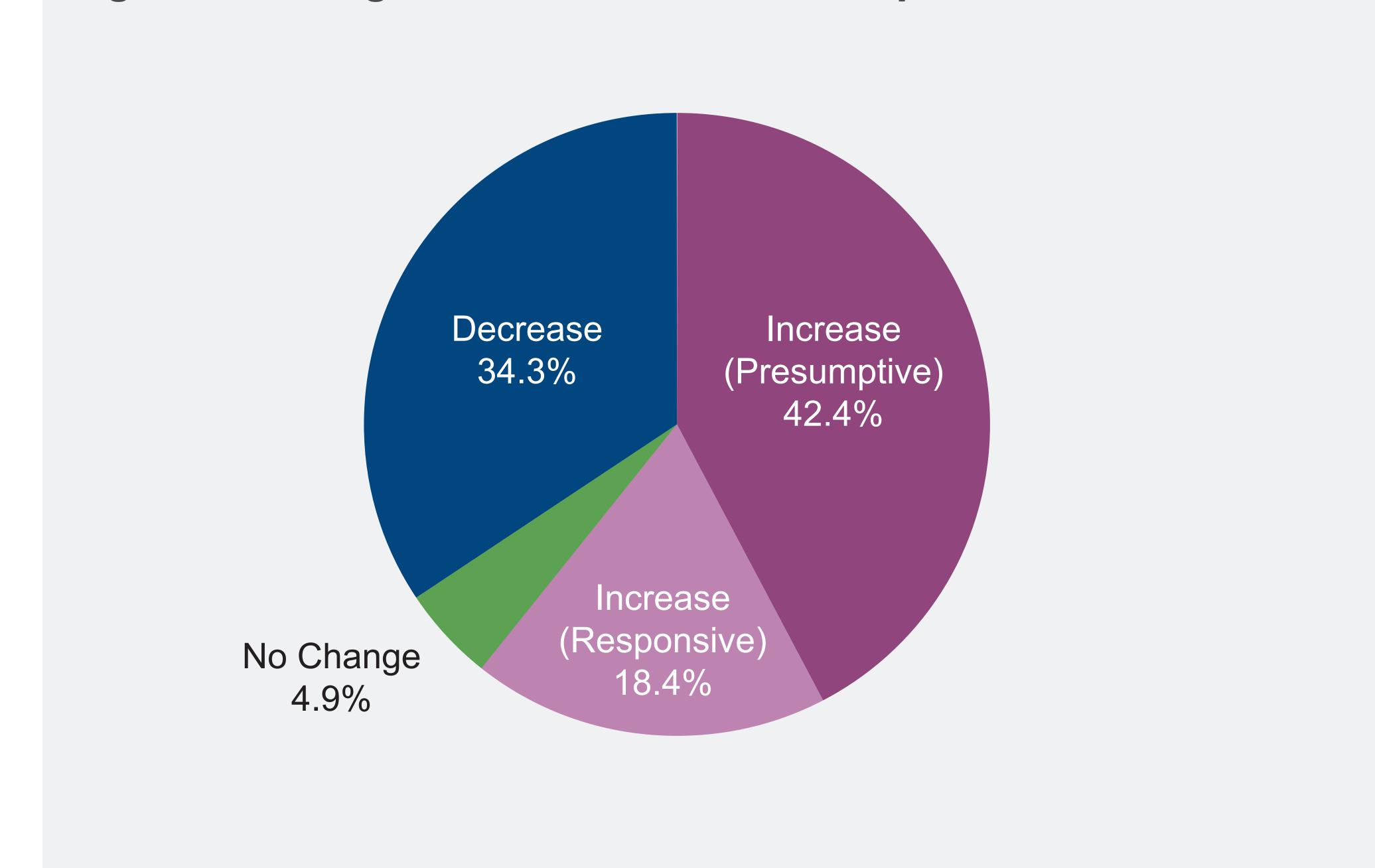
	Number of Hospitalizations	Mean Pre- Hospitalization Hb Level	Mean Post- Hospitalization Hb Level	Mean Change in Hb Level
AII	156,353 (100%)	11.48 g/dL	10.88 g/dL	-0.59 g/dL
Hb drop	117,455 (66.7%)	11.87 g/dL	10.55 g/dL	-1.32 g/dL
Hb unchanged	1,149 (0.7%)	11.25 g/dL	11.25 g/dL	
Hb rise	57,595 (32.7%)	10.67 g/dL	11.56 g/dL	+0.88 g/dL

Post-Hospitalization

	Number of Hospitalizations		Mean Post- Hospitalization ESA Dose	Mean Change in ESA Dose (SD)
AII	179,929 (100%)	8,213 U	9,535 U	+ 1,322 U (5,161)
ESA rise	109,420 (60.8%)	6,733 U	10,825 U	+ 4,091 U (3,918)
ESA unchanged	8,740 (4.9%)	10,890 U	10,890 U	
ESA drop	61,769 (34.3%)	10,456 U	7,061 U	- 3,395 U (3,784)

- Of a total of 289,042 hospitalizations, 181,595 (62.8%) occurred > 30 days after any previous event, and qualified for inclusion (Table 1).
- Analysis of Hb levels was restricted to hospitalizations where Hb test results for the pre- and post-hospitalization period were available (N = 156,353). Of these, 66.7% of events were associated with a drop in Hb (mean of 11.87 g/dL pre-hospitalization to 10.55 g/dL post-hospitalization) (Table 2).
- For hospitalizations where ESA dose data for the pre- and post-hospitalization periods were available (N = 179,929), 60.8% of events were associated with a mean rise in ESA dose. For these 109,420 events, the mean ESA dose was 6,733 U/session pre-hospitalization, and 10,825 U/session post-hospitalization, a mean rise of 4,091 U/session (SD = 3,918) (Table 3 and Figure 1).
- Of the 109,420 hospitalizations with mean per-session increases in ESA dose in the post-hospitalization period, 76,242 (69.7%) of these rises were presumptive (ESA dose change made before first post-hospitalization Hb test result obtained) and 33,178 (30.3%) were responsive (dose change occurred after first post-hospitalization Hb test result was obtained).
- Among the 76.242 hospitalizations that were associated with a responsive rise in ESA dose:
- 23,946 (72.2%) experienced a drop in ESA before first test
- 9,014 (27.2%) had no change in ESA before first test
- 218 (0.7%) did not have an ESA dose before their first test

Figure 1. Changes in ESA Dose Post-Hospitalization



Conclusions

- Hospitalizations frequently result in a drop in Hb levels and an increase in ESA dose in the post-hospitalization period.
- Two thirds (66.7%) of hospitalization events were associated with a drop in Hb levels in the 30 days following hospitalization compared to the 30 days before, with a mean change in Hb level of -1.32
- Approximately 60% of hospitalization events were associated with a rise in ESA dose in the 30 days post-hospitalization compared to the 30 days before, with a mean dose change of +4,091 U/session.
- The majority (69.7%) of post-hospitalization increases in ESA dose occur before the result of the first post-hospitalization Hb test is known.
- Strategies for better management of anemia during hospitalization and in the post-hospitalization period should be assessed.

References

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Table 3. ESA Dose Per-Session in the 30 Days Pre- and

79,929 (100%)	8,213 U	9,535 U	+ 1,322 U (5,161)
09,420 (60.8%)	6,733 U	10,825 U	+ 4,091 U (3,918)
8,740 (4.9%)	10,890 U	10,890 U	<u>—</u>
51,769 (34.3%)	10,456 U	7,061 U	- 3,395 U (3,784)
	09,420 (60.8%) 8,740 (4.9%)	09,420 (60.8%) 6,733 U 8,740 (4.9%) 10,890 U	09,420 (60.8%) 6,733 U 10,825 U 8,740 (4.9%) 10,890 U 10,890 U