

Evaluating the Impact of Change in Pre-Dialysis Weight on a Change in Measured Hemoglobin (Hb)

Joe Weldon, MBA*¹; Tracy Mayne, PhD¹; Steve Wilson, PhD¹; Mahesh Krishnan, MD, MBA, MPH, FASN¹
(1) DaVita Clinical Research, Minneapolis, MN

INTRODUCTION

The literature has shown an association between low hemoglobin (Hb), higher ESA doses and increased morbidity and mortality in dialysis patients. Many have questioned the role of confounding factors in this association. Interdialytic weight gain is also associated with increased morbidity and mortality. Increased volume status could produce spuriously low Hb measures via simple dilution, triggering ESA dose increases and confounding associations between both variables and outcomes. We examined the association between interdialytic weight gain, measured Hb, and ESA dose.

METHODOLOGY

- Retrospective analysis of 164,866 hemodialysis patients dialyzed between January 1 and December 31, 2009 at a large dialysis organization (Table 1).
- Sequentially paired Hb values were created within a 30-day period.
- For each treatment corresponding to those dates, change in ESA and Hb were recorded and categorized by change in pre-dialysis weight.
- The analysis included multiple observations per patient.
- To control for multiple measurements within patients, the weighted Pearson product moment correlation was calculated on mean scores.

RESULTS

Table 1. Patient Demographics

Mean ± SD	DaVita Rx
N	164,866
Age (yr)	61.2 ± 15.4
% Male	55.7%
Race and Ethnicity	
% African American	35.1%
% Hispanic	14.9%
% Asian, Pacific Islander	3.6%
% Native American	1.3%
% Unknown	0.2%
% Diabetic	71.5%
Vintage (yr)	2.43 ± 3.4
BMI	28.5 ± 7.3

Table 2. Change in Hb and ESA dose by interdialytic weight gain

Change in Pre-Dialytic Weight	Matched Hb Draws	Change in Hb (g/dl) Mean ± SD	Change in Weekly ESA U from Prior Draw
> 2.0 to 10.0 kg	422,528	-0.29 ± 0.86	6.8%
0.5 to ≤ 2.0 kg	1,467,172	-0.09 ± 0.73	1.0%
> -0.5 to <0.5 kg	1,544,905	0.07 ± 0.70	-1.3%
-0.5 to ≤ -2.0 kg	1,473,124	0.23 ± 0.74	-2.5%
< -2.0 to -10.0 kg	478,550	0.39 ± 0.91	0.4%

CONCLUSIONS

- Prior mean Hb ranged from 11.2 to 11.7 g/dL and prior mean weekly ESA dose from 20k to 26k Units.
- Table 2 shows change in Hb and ESA dose by interdialytic weight gain category.
- The weighted Pearson correlation was $r = -0.17$ between change in pre-dialytic weight and change in Hb, and $r = 0.03$ between change in pre-dialytic weight and change in ESA dose.

KEY LEARNINGS

- ✓ Changes in pre-dialysis weight which may be surrogate for fluid status were associated with reciprocal changes in both Hb and, in sequence, ESA dose.
- ✓ Given the magnitude of these effects, changes in pre-dialysis weight may be a clinically meaningful confounder of the relationship between Hb, ESA dose, and morbidity and mortality in dialysis patients.

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*Correspondence: joe.weldon@davita.com
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