The Association Between Attaining Prescribed Hemodialysis Target Weight and Patient Outcomes

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Definitions (for this presentation)

- **Dry weight**: weight at which patient is extracellularly euvoletic.
- **Target weight**: weight ordered as the goal for dialysis treatment.
- **“Missed target weight”**: treatments where post-dialysis weight 1+ kg above target weight.
Introduction

- Extracellular euvolemia is an important but elusive therapeutic goal for hemodialysis patients

- Two categories of issues that interfere with attainment:
  1. Misspecification of target weight (ie, ≠ dry weight)
  2. Failure to achieve target weight

- This study was designed to examine possible implications of #2
Objectives

1. To estimate at the patient-level the associations of missed target weight with: a) all-cause mortality and b) missed treatment rate

2. To explore at the facility-level the association of missed target weight with missed treatment rate
Methods: Patients

- Retrospective analysis of all adult patients who received in-center hemodialysis at a DaVita facility from 1-Jan-2012 until at least 1-Apr-2012.
Methods: Exposure

Confounder assessment period

Baseline period: missed target weight

Outcome period

1-Oct-2011 1-Jan-2012 1-Apr-2012 31-Mar-2013, death, or loss to follow up

Example: Patient A

• had 36 treatments during baseline period
• missed target weight in 9 of these
  ➢ 25% (=9/36) treatments affected
Methods: Outcomes

- Death (any cause)
- Missed treatment rate: # missed treatments/unit time

Confounding assessment period
Baseline period: missed target weight
Outcome period

1-Oct-2011 1-Jan-2012 1-Apr-2012 31-Mar-2013, death, or loss to follow up
Results

- Follow up (overall):
  - 93,971 patient-years at-risk
  - 12,854 deaths (13.7 deaths/100 patient-years)
  - 1,284,943 missed treatments (13.7 missed treatments per patient per year)

<table>
<thead>
<tr>
<th>% Baseline Treatments with Missed Target Weight</th>
<th>N (% population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>16,298 (15.3%)</td>
</tr>
<tr>
<td>1-20%</td>
<td>45,142 (42.3%)</td>
</tr>
<tr>
<td>21-40%</td>
<td>21,572 (20.2%)</td>
</tr>
<tr>
<td>&gt;40%</td>
<td>23,658 (22.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>106,670</td>
</tr>
</tbody>
</table>
Results: Patient-Level Mortality

There was a potent, incremental and independent association between missed target weight and subsequent all-cause mortality.

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<tr>
<th>Proportion of baseline treatments with missed target weight</th>
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<th>21-40%</th>
<th>&gt;40%</th>
</tr>
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<tr>
<td>Crude death rate (Deaths/100 pt-yr)</td>
<td>10.5</td>
<td>12.8</td>
<td>15.6</td>
<td>15.9</td>
</tr>
</tbody>
</table>

Adjusted for baseline age, sex, race, etiology ESRD, diabetes, heart failure, coronary artery disease, Charlson Comorbidity Index, albumin, Kt/V, phosphorus, hemoglobin, ESA dose, post-dialysis weight, interdialytic weight gain, pre-dialysis systolic BP, hospitalization status for October 2011, hospitalization status November 2011, and hospitalization status December 2011.
Results: Patient-Level Missed Treatments

There was a potent, incremental and independent association between missed target weight and subsequent missed treatment rate.

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<tr>
<td>Crude rate (Missed tx/ pt-yr)</td>
<td>10.7</td>
<td>12.2</td>
<td>14.6</td>
<td>17.1</td>
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Adjusted for baseline age, sex, race, etiology ESRD, diabetes, heart failure, coronary artery disease, Charlson Comorbidity Index, albumin, Kt/V, phosphorus, hemoglobin, ESA dose, post-dialysis weight, interdialytic weight gain, pre-dialysis systolic BP, hospitalization status for October 2011, hospitalization status November 2011, and hospitalization status December 2011.
Results: Facility-Level Missed Treatments
Conclusion

- Missed treatment weight is a marker of increased risk of subsequent death and missed treatment rate.
Potential Mechanisms

1. Missing target weight causes poor clinical outcomes.

2. Misspecification of target weight causes poor clinical outcomes and also predisposes to failure to attain target weight.

3. Dialytic factors (eg, rapid ultrafiltration) cause poor clinical outcomes and also predispose to failure to attain target weight.

4. High interdialytic weight gain causes poor clinical outcomes and also predisposes to failure to attain target weight.

5. Some combination of these.
Clinical Responses

- Specify target weight correctly and update frequently.
- Take steps to minimize interdialytic weight gain.
- Prescribe treatments that enable consistent attainment of target weight.
- Until further data become available, choice and prioritization among these are at the discretion of the treating nephrologist and be tailored to individual patients and circumstances.
Questions and Answers