

# Analysis Of Potassium Profiles Among Hemodialysis (HD) Patients

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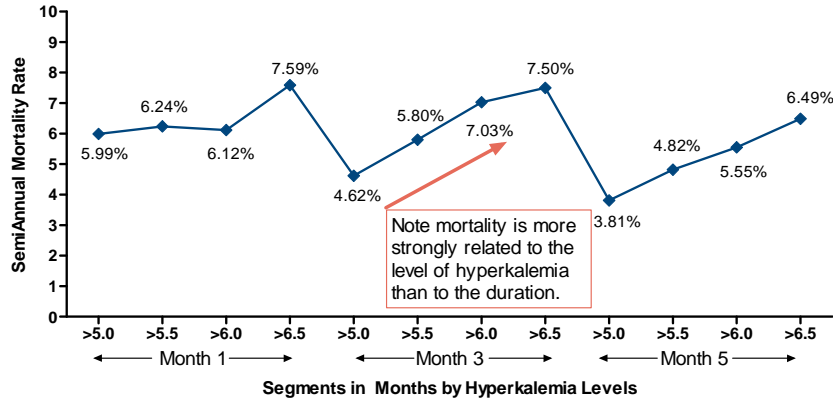
## INTRODUCTION

Hyperkalemia is considered a risk factor for hemodialysis (HD) patients. This study was designed to gain understanding of the in-center HD patient population experiencing hyperkalemia and the impact on clinical outcomes, specifically mortality rates.

## METHODOLOGY

- This study was designed to determine
  - serum potassium distributions among HD patients
  - relationship between differing levels and durations of hyperkalemia as it relates to mortality
- Included were all DaVita® patients >18 years old receiving HD treatments between January and December, 2007
  - Full Cohort: qualifying patients in the dataset at any time during the 1-year observation period; (N=113,764)
  - Tracking Cohort: qualifying patients who survived from January to June with mortality being assessed from July to December, 2007; (N=40,358)
  - The full-cohort was used to assess the distribution of hyperkalemia and the tracking cohort was used to determine the effect of hyperkalemia on mortality

Figure 1. Relationship of Hyperkalemia and Mortality Rate



## RESULTS

- While over 70% of HD patients were found to have normal levels [3.5 to 5.0 mEq/l] of potassium in periods of at least 6 months or more in the observation year, almost ¼ of the patients (23%) had levels of hyperkalemia (>5.5 mEq/l) over a period of time (> 3 months) that could have significant negative consequences on mortality (Table 1)
- Among patients who are hyperkalemic for 1-2 months, there was a 7.6% increase in mortality at the highest hyperkalemia level (6.5 mEq/l), but this was not significantly different from normokalemic patients
- For those who were hyperkalemic for 3-4 months, a linear rise in mortality was seen as hyperkalemia levels rose; most increases were different from the mortality rate of normokalemic patients (7.5% vs. 5.91%,  $p < 0.0533$ )
- Hyperkalemia was strongly associated with negative clinical outcomes (mortality); and this mortality was more strongly related to the level of hyperkalemia than to the duration of hyperkalemia in HD patients after the period of hyperkalemia exceeds 2 months (Figure 1)

Table 1: Monthly Serum Potassium (K) Laboratory Values

| K mEq/l | N       | cumulative % | DaVita Limits % | 3.5-5.5 Limits % |
|---------|---------|--------------|-----------------|------------------|
| 3.4     | 1,239   | 1%           | 1%              | 1%               |
| 3.5     | 1,734   | 3%           |                 |                  |
| 3.6     | 2,122   | 4%           |                 |                  |
| 3.7     | 2,671   | 7%           |                 |                  |
| 3.8     | 3,250   | 10%          |                 |                  |
| 3.9     | 3,844   | 13%          |                 |                  |
| 4.0     | 4,688   | 17%          |                 |                  |
| 4.1     | 5,045   | 22%          |                 |                  |
| 4.2     | 5,693   | 27%          |                 |                  |
| 4.3     | 6,103   | 32%          |                 |                  |
| 4.4     | 6,654   | 38%          |                 |                  |
| 4.5     | 6,713   | 44%          |                 |                  |
| 4.6     | 6,663   | 50%          |                 |                  |
| 4.7     | 6,651   | 55%          |                 |                  |
| 4.8     | 6,501   | 61%          |                 |                  |
| 4.9     | 6,012   | 66%          |                 |                  |
| 5.0     | 5,649   | 71%          |                 |                  |
| 5.1     | 5,404   | 76%          |                 |                  |
| 5.2     | 4,801   | 80%          |                 |                  |
| 5.3     | 4,227   | 84%          |                 |                  |
| 5.4     | 3,893   | 88%          |                 |                  |
| 5.5     | 3,468   | 91%          |                 |                  |
| 5.6     | 2,960   | 93%          |                 |                  |
| 5.7     | 2,490   | 95%          |                 |                  |
| 5.8     | 2,079   | 97%          |                 |                  |
| 5.9     | 1,725   | 99%          |                 |                  |
| 6.0     | 1,495   | 100%         |                 |                  |
| total   | 113,764 |              |                 |                  |

The 50th percentile (median) value is 4.6 mEq/l. No patients fell into the "low panic level" (2.5) and no patients fall into the "high panic level" (7.0).

## CONCLUSION

These findings imply that high levels of potassium, even for short periods of time, are associated with significantly negative outcomes.

The dramatic effect of heightened serum potassium on mortality rates should be further examined to determine marker or causal relationship. This study was not designed to address this issue.

Assessment of other factors, population demographics, and interventions can have a significant impact on this important outcome discovery.

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