

Frequency of Hyperkalemia Events in Dialysis Patients in a Large Dialysis Organization

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Introduction

- Hyperkalemia is a common and important disorder in hemodialysis (HD) patients.
- Hyperkalemia is associated with increased risk of arrhythmias and sudden cardiac death.¹
- Few studies² have examined its occurrence in a large population of HD patients.
- We investigated hyperkalemia prevalence and its association with interdialytic interval.

Methods

DATA AND STUDY COHORT

- Annual cohorts of HD patients 2007-2010 were created using the linked DaVita/USRDS database.
- Inclusion criteria:
 - Prevalent HD patient, aged ≥ 18 years, on a thrice-weekly schedule.
 - Alive and continuously enrolled in fee-for-service Medicare Parts A and B with no participation in an HMO from July 1 of the prior year through January 31 of the cohort year.
 - Received ≥ 6 dialysis sessions in December of the prior year.
 - No missing potassium (K) dialysate bath records for dialysis treatments in December of the prior year.
 - Serum K records in January of the cohort year.

STUDY MEASURES

- On a monthly basis, hyperkalemia was defined as a serum K concentration ≥ 5.5 mEq/L.
- Hyperkalemia prevalence was calculated as the cumulative number of monthly episodes divided by cumulative follow-up time.
- Hyperkalemia prevalence was also reported separately by long and short interdialytic interval.
 - HD schedule was defined as Monday-Wednesday-Friday (MWF) or Tuesday-Thursday-Saturday (TThS).
 - The day after the 2-day interval between sessions ("long interdialytic interval") was defined as M for patients on a MWF schedule and as T for patients on a TThS schedule.³
 - Thus, for patients on an MWF schedule, hyperkalemia events occurring on M were attributed to a long interdialytic interval; T was treated analogously.

Results

- 28,769 patients were included in 2007 and 36,879 in 2010 (Table 1).
- The mean age was approximately 63 years; slightly more than half of patients were white and approximately 56% were men.
- Hyperkalemia prevalence was consistent at 16.3-16.8 events per 100 patient-months (Table 2).
- For hyperkalemia episodes on the day after the long interdialytic interval, prevalence was 58.7-62.9 per 100 patient-months (Table 3).
- In contrast, for hyperkalemia episodes on the day after the short interdialytic interval, prevalence was 26.2-28.8 per 100 patient-months.
- Hyperkalemia was 2.0-2.4 times more likely on the day after the long dialytic interval than on the day after the short interval.

Table 1. Demographic characteristics of patients included in study cohorts

	2007	2008	2009	2010
Cohort size, n	28769	34785	34567	36879
Age, mean (SD), years	62.8 (14.7)	62.9 (14.7)	62.7 (14.7)	62.9 (14.6)
Men, %	54.8	55.7	56.2	56.0
Race, %				
White	50.3	51.2	51.0	51.7
Black	43.8	43.1	42.8	42.2
Other races	6.0	5.8	6.1	6.1

Table 2. Prevalence of hyperkalemia episodes per 100 patient-months in hemodialysis patients

Cohort year	Number of High K events	Follow-up time in months	Number of events/100 pat-months
2007	22,562	135,354	16.7
2008	27,631	164,519	16.8
2009	28,070	169,895	16.5
2010	26,606	162,902	16.3

Table 3. Prevalence of hyperkalemia episodes per 100 patient-months in hemodialysis patients by interdialytic interval

Cohort year	Number of events per 100 patient-months	
	Events on day after long interdialytic interval	Events on day after short interdialytic interval
2007	58.7	28.8
2008	62.2	27.6
2009	62.9	26.3
2010	61.6	26.2

Conclusions

- Hyperkalemia is highly prevalent among maintenance HD patients.
- Hyperkalemia rates are more than twice as high on the day after the long interdialytic interval than on the day after the short interval.
- This phenomenon may be partly responsible for the reported increased rates of adverse events during the long interdialytic interval.^{3,4}
- Further studies of this important issue are clearly warranted to investigate how the timing of dialysis influences hyperkalemia and, as a result, mortality in HD patients.

References

- Weiner ID et al, 1998
- Mount DB et al, 2004
- Foley R et al, 2011
- USRDS ADR 2012; Vol 2, Ch 3. Fig 11-13.



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