

30-Day Readmission Rates after Heart Failure and Hypertensive Disease Discharges in Daily Home Hemodialysis, Peritoneal Dialysis, and In-Center Hemodialysis Patients

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Introduction

- ◆ Live discharges from the hospital with a principal diagnosis of heart failure (HF) are an especially important target for quality improvement.
- ◆ Medicare may reduce reimbursement to short-term hospitals partially on the basis of the 30-day readmission rate after such discharges.
- ◆ The thrice-weekly schedule of in-center hemodialysis engenders substantial day-to-day variation in volume status and may increase the risk of left ventricular hypertrophy and diastolic heart failure.
- ◆ In a recent study, daily home hemodialysis (DHHD) was associated with decreased risk of hospitalization for HF, relative to thrice-weekly in-center hemodialysis (Weinhandl ED et al, *AJKD*, 2015;65:98-108).
- ◆ In turn, DHHD may be a useful treatment for reducing the high rate of 30-day readmission among dialysis patients.
- ◆ We assessed associations of DHHD, peritoneal dialysis (PD), and in-center hemodialysis (IHD) with 30-day readmission risk after discharges for HF and hypertensive disease (HTN).

Methods

- ◆ Data were ascertained from the United States Renal Data System (USRDS) database and linked records from NxStage Medical, Inc. (Lawrence, Massachusetts).
- ◆ DHHD patients initiated use of the NxStage System One between January 1, 2007, and June 30, 2010.
- ◆ Matched PD and IHD patients were selected from the USRDS database at ratios of 1-to-1 and 5-to-1, respectively, and according to the propensity score (PS) of DHHD initiation.
- ◆ The PS included demographic factors, comorbidity factors, and biochemistry ascertained from the CMS ESRD Medical Evidence Report (form CMS-2728).
- ◆ Patients were followed from the home dialysis initiation date or matched index date (in IHD patients) until the earliest of death, change in dialytic modality, kidney transplant, or December 31, 2010.
- ◆ During follow-up, live discharges with a principal diagnosis of HF or HTN were identified from Medicare claims.
 - ◆ Codes for HF: 276.6, 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.x, 428.x
 - ◆ Codes for HTN: 401.x-405.x (excluding codes for HF)
- ◆ We identified the incidence of readmission with 30 days of discharge.

Results

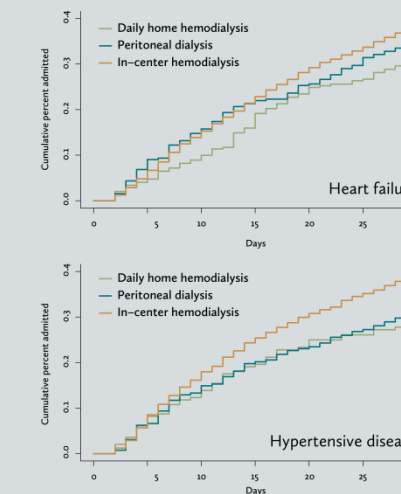
- ◆ We identified 3560 DHHD patients, 3560 matched PD patients, and 17,800 matched IHD patients
- ◆ Groups were balanced in demographic factors, with all absolute standardized difference (ASDs) less than 10%, except for the difference in vintage for DHHD versus PD (ASD, 10.5%).
- ◆ Hospital admission rates for both HF and HTN were lower in DHHD versus each of PD and IHD.
- ◆ In total, we observed the following numbers of live discharges with HF in each treatment group:
 - ◆ DHHD, $N = 297$ (among 231 patients)
 - ◆ PD, $N = 323$ (among 252 patients)
 - ◆ IHD, $N = 3520$ (among 2051 patients)
- ◆ In total, we observed the following numbers of live discharges with HTN in each treatment group:
 - ◆ DHHD, $N = 196$ (among 168 patients)
 - ◆ PD, $N = 258$ (among 215 patients)
 - ◆ IHD, $N = 1929$ (among 1268 patients)
- ◆ Following discharge for HF, 30-day readmission rates in each treatment group were:
 - ◆ DHHD, 30.3%
 - ◆ PD, 33.4% (hazard ratio for PD versus DHHD, 1.15; 95% CI, 0.86-1.55; $P = 0.35$)
 - ◆ IHD, 37.3% (hazard ratio for IHD versus DHHD, 1.27; 95% CI, 1.00-1.60; $P = 0.94$)
- ◆ Following discharge for HTN, 30-day readmission rates in each treatment group were:
 - ◆ DHHD, 27.6%
 - ◆ PD, 29.1% (hazard ratio for PD versus DHHD, 1.01; 95% CI, 0.70-1.46; $P = 0.048$)
 - ◆ IHD, 38.4% (hazard ratio for IHD versus DHHD, 1.42, 95% CI, 1.06-1.90; $P = 0.019$)

Baseline characteristics and follow-up admissions

	DHHD	PD	IHD
Age (mean yr)	54.0	55.2	54.2
Race (%)			
Black	26.5	26.5	27.0
Non-black	73.5	73.5	73.0
Sex (%)			
Female	36.3	33.8	33.9
Male	63.7	66.2	66.1
Vintage (mean yr)	5.6	4.9	5.4
Admission rate [1]			
For HF	6.90	9.41	13.51
For HTN	8.44	11.00	11.16

[1] per 100 patient-years during follow-up

Readmissions after discharge for HF and HTN



Conclusions

- ◆ Within 30 days after live discharge with principal diagnoses of heart failure or hypertensive disease, DHHD was associated with similar risk of readmission as PD, although risk was nominally lower for DHHD after discharge with heart failure.
- ◆ More importantly, within 30 days after live discharge with principal diagnoses of heart failure or hypertensive disease, DHHD was associated with significantly lower risk of readmission than IHD.
- ◆ Absolute differences in readmission rates were between 7 and 10 percentage points for DHHD versus IHD.
- ◆ These results suggest that patients on thrice-weekly hemodialysis with heart failure and a history of rehospitalization may be suitable candidates for daily home hemodialysis.
- ◆ Migration of such candidates from thrice-weekly in-center hemodialysis to daily home hemodialysis may be particularly efficient in accountable care organizations, where the costs of both home hemodialysis training and hospitalization are shared by a set of health care providers.
- ◆ Aside from capitated payment models, these results are relevant to the ESRD Quality Incentive Program (QIP), which will add the standardized readmission ratio to dialysis facility assessment and associated reimbursement in performance year 2016 (payment year 2018).



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