

Lower Risk of Early Death in Incident Dialysis Patients on Daily Home versus In-center Hemodialysis

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Introduction

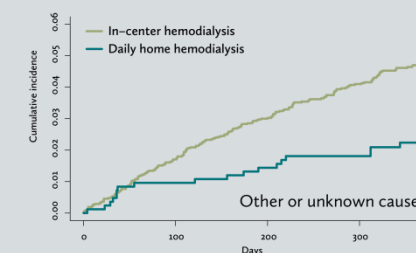
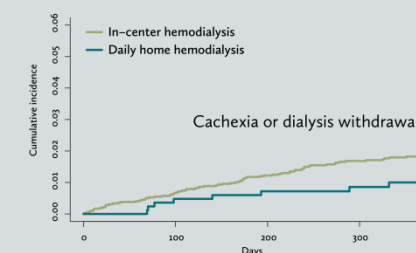
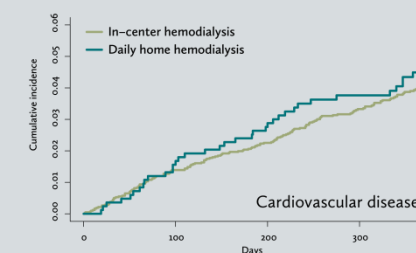
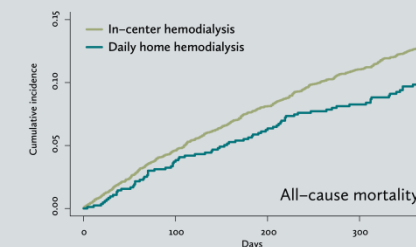
- ◆ Most patients newly diagnosed with end-stage renal disease (ESRD) initiate thrice-weekly in-center hemodialysis.
- ◆ However, despite recent decreases in mortality rates, clinical outcomes in the first year of dialysis are relatively poor.
- ◆ According to the United States Renal Data System, one-year survival among new dialysis patients in 2011 was 78.6%.
- ◆ According to the Peer Report, rates of death due to withdrawal from dialysis are especially high during the first 4 months.
- ◆ New strategies are needed to ease the transition to chronic dialysis and improve early outcomes.
- ◆ To date, most patients have begun daily home hemodialysis (DHHH) after years of in-center treatment.
- ◆ However, beginning DHHH early in the course of ESRD may be an effective strategy for improving first-year outcomes.
- ◆ We assessed the relative risk of early death in DHHH versus matched in-center hemodialysis (IHD) patients.

Methods

- ◆ Data were ascertained from the United States Renal Data System (USRDS) database and linked records from NxStage Medical, Inc. (Lawrence, Massachusetts).
- ◆ DHHH patients initiated use of the NxStage System One between January 1, 2007, and June 30, 2010, and within 3 months of ESRD diagnosis.
- ◆ Matched IHD patients were selected from the USRDS database at a ratio of 5-to-1 and according to the propensity score (PS) of DHHH initiation.
- ◆ The PS included demographic factors, comorbidity factors, and biochemistry ascertained from the CMS ESRD Medical Evidence Report (form CMS-2728).
- ◆ We employed the intention-to-treat principle: we followed patients from the DHHH initiation date or the matched index date (in IHD patients) until the earlier of death or the conclusion of 1 year.
- ◆ Cause of death was ascertained from the ESRD Death Notification (form CMS-2746).
- ◆ Relative hazards of death for DHHH versus matched IHD patients were estimated from Cox proportional hazards regression, with stratification by matched cluster.

Results

- ◆ We identified 834 DHHH patients and 4170 matched IHD patients.
- ◆ There were 79 deaths (9.5%) in DHHH patients and 512 deaths (12.3%) in matched IHD patients.
- ◆ Among deaths in DHHH patients, counts by cause of death were:
 - ◆ Cardiovascular disease, $N = 36$
 - ◆ Infection, $N \leq 10$
 - ◆ Cachexia or dialysis withdrawal, $N \leq 10$
 - ◆ Malignancy, $N \leq 10$
 - ◆ Other or unknown cause, $N = 18$
- ◆ After 1 year of follow-up, cumulative incidence of death was 9.8% in DHHH and 12.7% in IHD.
 - ◆ Number needed to treat to prevent one death during the first year of dialysis, $N = 34$
- ◆ The mortality hazard ratio (MHR) for DHHH versus matched IHD patients was 0.71 (95% confidence interval, 0.56-0.91).
- ◆ Corresponding cause-specific MHRs were:
 - ◆ Cardiovascular disease, 1.08 (0.74-1.57)
 - ◆ Infection, 1.08 (0.53-2.22)
 - ◆ Cachexia or dialysis withdrawal, 0.48 (0.23-1.00)
 - ◆ Malignancy, 0.73 (0.32-1.65)
 - ◆ Other or unknown cause, 0.43 (0.26-0.69)
- ◆ Among deaths of other or unknown cause in DHHH patients, 70% were of unknown cause.
- ◆ In statistical simulation, proportional and random reclassification of such deaths into bins of known etiology moves the cardiovascular disease-specific MHR for DHHH versus IHD to less than 1.



Conclusions

- ◆ DHHH was associated with significantly lower risk of death in the first year of treatment than IHD.
- ◆ The mortality risk difference was primarily attributable to survival advantages for DHHH patients in two causes of death:
 - ◆ Cachexia or dialysis withdrawal
 - ◆ Unknown causes of death
- ◆ The association of DHHH with lower risk of cachexia or withdrawal may indicate that DHHH better supports high quality of life during the transition to ESRD than does thrice-weekly hemodialysis in a facility.
- ◆ Unknown causes of death may tend to be cardiovascular in etiology, such as when sudden cardiac death occurs outside of a health care facility and no ESRD Death Notification is completed.
- ◆ Nevertheless, DHHH was not associated with risk of cardiovascular death in the first year.
- ◆ However, prescription of DHHH to new dialysis patients has been atypical. DHHH patients in this study may suffer from unmeasured cardiovascular complications, such as higher New York Heart Association functional class. Thus, some results in this study may be biased against DHHH.
- ◆ Further assessments of DHHH in incident dialysis patients are critically needed.



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