

Lower Risk of Hospitalization in Daily Home Hemodialysis versus Peritoneal Dialysis Patients

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Introduction

- Both frequent hemodialysis (HD) and peritoneal dialysis (PD) offer benefits and risks regarding cardiovascular morbidity and infection.
- Regarding frequent HD:
 - In-center HD for 6 versus 3 times per week reduces left ventricular mass and systolic blood pressure. The FHN Trial Group, *NEJM*, 2010
 - Daily home versus thrice-weekly in-center HD is associated with lower risk of hospitalization for cardiovascular morbidity and higher risk of hospitalization for infection. ED Weinhandl et al, *AJKD*, in press
- Regarding PD:
 - Relative to HD, PD associates with improved hemodynamic stability, and in oliguric patients, preservation of residual renal function.
 - However, PD confers risk of fluid overload, due to non-adherence with prescription, poor glycemic control, and membrane dysfunction.
 - Exit-site catheter infections and peritonitis are common.
- Although home dialysis is growing rapidly in the US, few data compare the two home modalities, daily home hemodialysis (DHHD) and PD.
- We aimed to compare the risks of hospitalization in US patients initiating either DHHD or PD.

Methods

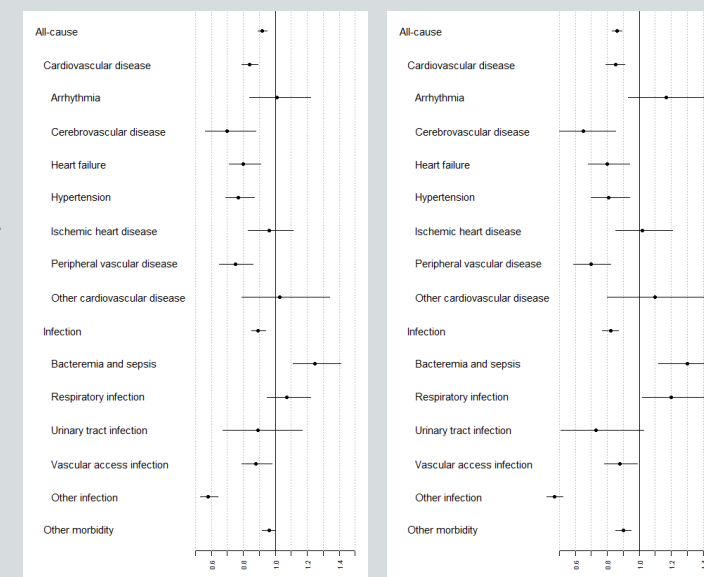
- NxStage Medical, Inc., records and United States Renal Data System (USRDS) standard analysis files were linked.
- From NxStage records, we identified patients who initiated DHHD between January 1, 2007, and June 30, 2010.
- From USRDS standard analysis files, we identified patients who initiated PD (for the first time) between October 1, 2006, and September 30, 2010.
- We retained the subset of these patients with Medicare coverage for ≥ 3 months before home dialysis initiation.
- For each DHHD patient, we selected 1 matched PD patient according to the date of home dialysis initiation, 4 blocking factors, and a 33-factor propensity score of DHHD initiation.
 - Blocking factors were duration of ESRD (≤ 6 , > 6 months), Medicare Part D enrollment, hospital before home dialysis initiation (0, ≥ 1 admission during 3 preceding months), and dialysis provider (DaVita, other).
- In intention-to-treat (ITT) analysis, we followed patients from home dialysis initiation to the earlier of death or December 31, 2010.
- In on-treatment (OT) analysis, we also censored patients at the cessation of home dialysis.
- Admissions were ascertained from Medicare Part A claims and causes of admission from principal diagnoses.

Results

- We identified 3560 DHHD and 3560 matched PD patients.
- All baseline characteristics were balanced (absolute standardized differences $< 10\%$).
- In ITT analysis, all-cause hospitalization rates per patient-year were:
 - For admissions, 1.71 versus 1.96 for DHHD versus PD, respectively.
 - For hospitalized days, 10.2 versus 12.2 for DHHD versus PD, respectively.
- The ITT all-cause admission hazard ratio (HR) was 0.92 (95% confidence interval, 0.89-0.95) for DHHD versus PD.
 - The corresponding OT HR was 0.86 (0.83-0.89).
- HRs for first admission and subsequent admissions were similar in magnitude.
- For admissions related to cardiovascular disease and to infection, ITT HRs were 0.84 (0.79-0.89) and 0.89 (0.85-0.94), respectively.
 - For heart failure, 0.80 (0.71-0.91).
 - For hypertension, 0.77 (0.69-0.87).
 - For bacteremia and sepsis, 1.25 (1.11-1.41).
 - For access infection (including peritonitis), 0.88 (0.79-0.98).
- In the subset of DHHD and PD patients with ESRD duration ≤ 6 months, the ITT all-cause admission HR was 0.96 (0.88-1.05).
 - For cardiovascular disease, 0.89 (0.75-1.06)
 - For infection, 1.01 (0.87-1.18)

Hazard ratios of hospital admission for daily home hemodialysis versus matched peritoneal dialysis patients, from Prentice-Williams-Peterson regression of recurrent events

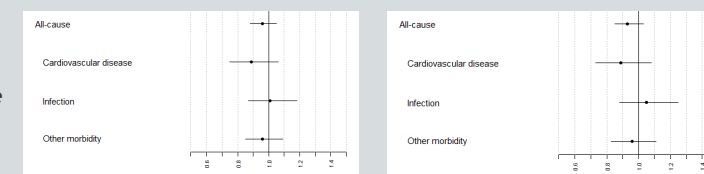
Left panel: intention-to-treat (ITT) follow-up; Right panel: on-treatment (OT) follow-up



Hazard ratios of hospital admission for daily home hemodialysis versus matched peritoneal dialysis patients, from Prentice-Williams-Peterson regression of recurrent events

Among patients that initiated home dialysis within < 6 months of ESRD onset

Left panel: intention-to-treat (ITT) follow-up; Right panel: on-treatment (OT) follow-up



Conclusions

- DHHD was associated with lower risk of hospitalization than PD in multiple dimensions, including:
 - All-cause admission.
 - First admission.
 - Subsequent admissions.
 - Admissions due to cardiovascular disease, and specifically heart failure.
 - Admissions due to infection, and specifically access infection.
- However, DHHD was associated with higher risk of hospitalization for sepsis.
- In the subset of patients who initiated home dialysis shortly after maintenance dialysis initiation, the risk of hospitalization was statistically similar for DHHD versus PD, but admissions due to cardiovascular disease were less likely in DHHD.
- All observational studies are limited by the possibility of residual confounding. Missing from this study are data regarding the rationale for initiating PD in existing dialysis patients who had undergone in-center HD for years beforehand.
- Updated studies are needed to assess relative risks of hospitalization for DHHD versus PD in patients who initiated home dialysis after the advent of the Medicare ESRD Prospective Payment System.
- Studies are also needed to assess relative Medicare costs due to hospitalization for DHHD versus PD.



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