Use of Incremental Peritoneal Dialysis: Impact on Clinical Outcomes and Quality of Life Measures

Mihran Naljayan, MD;[1,2] Francesca Tentori, MD, MS;[3,4] Abigail Hunt, PhD;[3,4] Katherine McKeon, MSPH;[3,4] Martin J. Schreiber, MD;[1] Steven M. Brunelli, MD, MSCE[3,4]

[1]DaVita Kidney Care, Denver, CO, USA; [2]LSU School of Medicine, New Orleans, LA, USA; [3]DaVita Clinical Research, Minneapolis, MN, USA; [4]DaVita Patient Safety Organization, Denver, CO, USA

Introduction

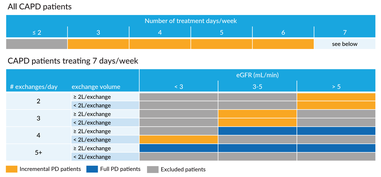
- Incremental PD can be defined as a PD prescription that is less than the standard, full-dose prescription.
- It has been suggested that use of incremental PD in incident patients may help to preserve residual kidney function and may also offer better quality of life due to the lower treatment burden, however published evidence is limited.

Objective

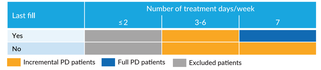
- To compare outcomes between patients who use incremental PD vs. those who use standard, full-dose PD

Methods

- This retrospective, observational analysis considered adult patients initiating PD between 31 July 2015 and 31 May 2019.
- Patients with body weight <40 kg, amputation, or eGFR during the first 4 weeks on PD >20 mL/min were excluded.
- Patients were assigned to exposure group (incremental vs full PD) based on PD prescription during dialysis weeks 5-8 (exposure assignment period):
  - For continuous ambulatory PD (CAPD) patients, incremental PD was defined by treatment frequency, number of exchanges/day, exchange volume, and eGFR.



  - For automated PD (APD) patients, incremental PD was definded by treatment frequency and presence/absence of last fill.



- Analyses were performed separately for CAPD and APD. For each, incremental PD patients were propensity score matched to eligible full-dose PD patients. Patients were followed from the end of the exposure assignment period for up to 12 months or until censoring for loss to follow-up or study end.
- Outcome comparisons were made using Poisson models (mortality, hospitalization, PD failure), linear mixed models (eGFR), and paired t-tests (KDQOL domain scores).

Results

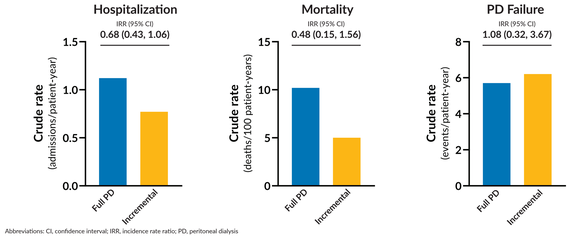
CAPD

Table 1. Patient Characteristics: CAPD Patients, Matched Study Cohort

	Full PD N = 107	Incremental PD N = 107	*P*-Value
Age, years, mean ± SD	58.0 ± 13.5	57.1 ± 13.5	0.65
Female, n (%)	45 (42.0)	54 (50.5)	0.22
Race, n (%)			0.62
White	61 (57.0)	53 (49.5)	
Black	24 (22.4)	22 (20.6)	
Hispanic	≤ 10	13 (12.2)	
Asian	≤ 10	≤ 10	
Other/missing	≤ 10	12 (11.2)	
Etiology, n (%)			0.35
Diabetes	44 (41.1)	35 (32.7)	
Hypertension	14 (13.1)	22 (20.6)	
Other	49 (45.8)	50 (47.1)	
Insurance type, n (%)			> 0.99
Commercial	44 (41.1)	44 (41.1)	
Other	63 (58.9)	63 (58.9)	
Charlson comorbidity index score, n (%)			0.97
2	13 (12.2)	15 (14.0)	
3	26 (24.3)	29 (27.1)	
4	22 (20.6)	21 (19.6)	
5	26 (24.3)	24 (22.4)	
6	20 (18.7)	18 (16.8)	
Diabetes, n (%)	66 (61.7)	57 (53.3)	0.21
eGFR, mL/min/1.73m^2, mean ± SD	13.0 ± 3.7	12.5 ± 3.7	0.41

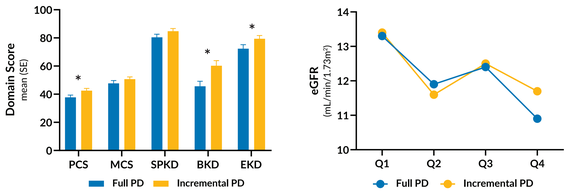
Abbreviations: eGFR, estimated glomerular filtration rate; PD, peritoneal dialysis

Figure 1. Hospitalization, Mortality, and PD Failure: CAPD Patients



Abbreviations: CI, confidence interval; IRR, incidence rate ratio; PD, peritoneal dialysis

Figure 2. KDQOL Domain Scores and eGFR: CAPD Patients



Plotted values represent crude mean and standard errors of scores among matched pairs where both patients had available data (n = 57). Timing of measurement = 3.8 months in both groups (*P* = 0.9 for difference).
* Indicates statistically significant difference between exposure groups (*P* < 0.05).
Abbreviations: BKD, burden of kidney disease; EKD, effects of kidney disease; PCS, physical composite score; PD, peritoneal dialysis; MCS, mental composite score; SE, standard error; SPKD, symptoms and problems of kidney disease.

Plotted values represent crude mean values in each quarter of follow-up. No statistically significant differences were observed across exposure groups.
Abbreviations: eGFR, estimated glomerular filtration rate; PD, peritoneal dialysis

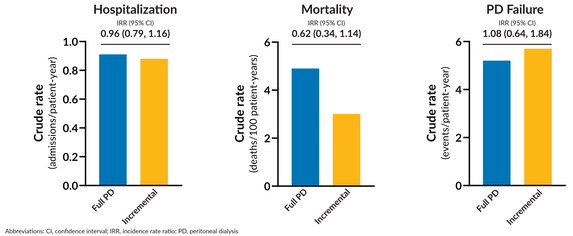
APD

Table 2. Patient Characteristics: APD Patients, Matched Study Cohort

	Full PD N = 722	Incremental PD N = 722	*P*-Value
Age, years, mean ± SD	56.9 ± 13.3	57.0 ± 13.5	0.83
Female, n (%)	281 (38.9)	245 (33.9)	0.05
Race, n (%)			0.02
White	355 (49.2)	401 (55.5)	
Black	182 (25.2)	132 (18.3)	
Hispanic	89 (12.3)	91 (12.6)	
Asian	36 (5.0)	44 (6.1)	
Other/missing	60 (8.3)	54 (7.5)	
Etiology, n (%)			0.18
Diabetes	276 (38.2)	257 (35.6)	
Hypertension	174 (24.1)	151 (20.9)	
Other	272 (37.7)	314 (43.5)	
Insurance type, n (%)			0.49
Commercial	405 (56.1)	392 (54.3)	
Other	317 (43.9)	330 (45.7)	
Charlson comrbidity index score, n (%)			0.84
2	106 (14.7)	109 (15.1)	
3	163 (22.6)	162 (22.4)	
4	166 (23.0)	171 (23.7)	
5	205 (28.4)	188 (26.0)	
6	82 (11.4)	92 (12.7)	
Diabetes, n (%)	423 (58.6)	407 (56.4)	0.39
eGFR, mL/min/1.73m^2, mean ± SD	11.6 ± 4.0	11.8 ± 3.9	0.47

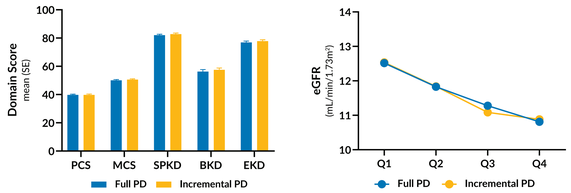
Abbreviations: eGFR, estimated glomerular filtration rate; PD, peritoneal dialysis

Figure 3. Hospitalization, Mortality, and PD Failure: APD Patients



Abbreviations: CI, confidence interval; IRR, incidence rate ratio; PD, peritoneal dialysis

Figure 4. KDQOL Domain Scores and eGFR: APD Patients



Plotted values represent crude mean and standard errors of scores among matched pairs where both patients had available data (n = 443). Timing of measurement = 3.8 and 4.0 months for full PD and incremental PD groups, respectively (*P*=0.38 for difference).
Abbreviations: BKD, burden of kidney disease; EKD, effects of kidney disease; PCS, physical composite score; PD, peritoneal dialysis; MCS, mental composite score; SE, standard error; SPKD, symptoms and problems of kidney disease.

Plotted values represent crude mean values in each quarter of follow-up. No statistically significant differences were observed across exposure groups.
Abbreviations: eGFR, estimated glomerular filtration rate; PD, peritoneal dialysis

CAPD Patients

- Characteristics of matched incremental and full-dose CAPD patients are shown in Table 1.
- In the context of CAPD, use of incremental PD was found to be associated with:
  - numerically lower hospitalization and mortality rates, but no detectable effect on PD failure rate (Figure 1)
  - significantly better KDQOL scores on 3 domains (Physical Composite Score, Burden of Kidney Disease, Effects of Kidney Disease; Figure 2)
  - no detectable effect on residual eGFR (Figure 2)

APD Patients

- Characteristics of matched incremental and full-dose APD patients are shown in Table 2.
- In the context of APD, use of incremental PD was associated with numerically lower mortality rate but no detectable effects on any of the other outcomes assessed (Figures 3 and 4).

Conclusions

- These results suggest that there may be benefits of using incremental PD in the context of CAPD, particularly with respect to quality of life measures.
- While no significant benefits were detected among patients initiating APD, no detrimental effects of using incremental PD were observed for either PD type.

Acknowledgments

This poster describes the results of a research project conducted by the DaVita Patient Safety Organization, a federally listed Patient Safety Organization, and is presented with its permission. The data discussed herein has been certified as non-identifiable pursuant to 42 C.F.R. 3.212(a)(1).

DaVita Clinical Research is a contractor to the DaVita Patient Safety Organization.

American Society of Nephrology Kidney Week, October 22-25, 2020