Impact of Structured Chronic Kidney Disease Transition Management on Outcomes among Patients Initiating Dialysis

Scott Sibbel, PhD, MPH; Abigail E. Hunt, PhD; Steven M. Brunelli, MD, MSCE; Robert Provenzano, MD

[1]DaVita Clinical Research, Minneapolis, MN, USA; [2]DaVita Inc, Denver, CO, USA

Introduction

- For patients with chronic kidney disease (CKD) approaching the transition to dialysis, timely receipt of transplant and modality education and referral for AV fistula creation may result in improved outcomes after dialysis initiation.
- Nephrology Practice Solutions (NPS) provides practice management services to physicians, including a structured process for managing the transition to dialysis.

Objectives

- We sought to assess the impact of the NPS CKD transition management process on patient outcomes over the first year on dialysis.

Methods

Data Source and Study Patients

- This was a retrospective observational study. All study data were derived from deidentified patient electronic health records of a large dialysis organization (LDO) in the US.
- Patients included in the analysis were adults (≥18 years) who initiated dialysis at the LDO between 01 July 2015 and 31 March 2019.

Exposure and Matching

- NPS patients were identified as those who had received care from an NPS physician prior to dialysis initiation. Control patients were those who initiated dialysis with no evidence of prior care from an NPS physician.
- NPS patients were matched 1:1 to eligible control patients.
  - Patients were matched exactly on race, insurance type, and geographic region and by propensity score (nearest neighbor method) calculated on the basis of age, sex, BMI, albumin, diabetes, year and month of dialysis initiation.
  - Balance across exposure groups was assessed through evaluation of standardized differences.

Outcomes and Statistical Analysis

- Patients were followed for up to 1 year from the date of first dialysis until end of study (30 Sep 2019) or censoring for death, transfer, withdrawal from dialysis, renal recovery, or loss to follow up.
- Outcomes considered were dialysis modality and access use, mortality and hospitalization. Comparisons across exposure groups were made using generalized linear models and time-to-event analysis, as appropriate.

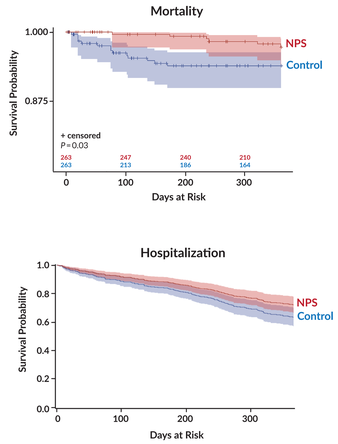
Results

Table 1. Patient Characteristics: Matched Study Cohort

	Control N = 263	NPS N = 263	Standardized Difference (%)
Age, years, mean ± SD	58.05 ± 13.3	58.2 ± 14.0	-2.2
Female, n (%)	93 (35.4)	106 (40.3)	10.1
Race, n (%)			N/A (exact match)
White	127 (48.3)	127 (48.3)	
Black	63 (24.0)	63 (24.0)	
Hispanic	26 (9.9)	26 (9.9)	
Asian	≤ 10	≤ 10	
Other/missing	39 (14.8)	39 (14.8)	
Insurance type, n (%)			tN/A (exact match)
Commercial	73 (27.8)	73 (27.8)	
Medicaid	40 (15.2)	40 (15.2)	
Medicare	148 (56.3)	148 (56.3)	
Other	≤ 10	≤ 10	
Region, n (%)			N/A (exact match)
Pacific Northwest	141 (53.6)	141 (53.6)	
South	76 (28.9)	76 (28.9)	
Mid-Atlantic	46 (17.5)	46 (17.5)	
BMI, kg/m2, mean ± SD	31.9 ± 7.9	31.0 ± 8.3	-11.1
Height, in, mean ± SD	66.8 ± 4.6	66.7 ± 5.0	-2.1
Charlson comorbidity index, mean ± SD	4.7 ± 1.5	4.6 ± 1.5	-6.7
Hemoglobin, g/dL, mean ± SD	9.8 ± 1.3	9.9 ± 1.5	7.1
Diabetes, n (%)	194 (73.8)	183 (69.6)	-9.3
Serum albumin, n (%)			
< 3 g/dL	40 (15.2)	43 (16.4)	3.3
3-3.2 g/dL	44 (16.7)	55 (20.9)	10.8
3.3-3.5 g/dL	83 (31.6)	68 (25.9)	-12.6
3.6-3.9 g/dL	46 (17.5)	36 (13.7)	-10.5
3.9-4.1 g/dL	50 (19.0)	61 (23.2)	10.3

Abbreviations: BMI, body mass index; NPS, Nephrology Practice Solutions

Figure 1. Mortality and Hospitalization



- A total of 263 patients receiving care from an NPS physician prior to dialysis initiation were identified during the study time period and were successfully matched to an eligible control patient.
  - Characteristics of NPS and control patients are shown in Table 1; there were no meaningful differences between the two groups.
- Clinical outcomes for NPS and control patients over the first year on dialysis were compared using time-to-event analyses; results are shown in Figure 1.
  - NPS patients were observed to have lower risk of mortality and hospitalization than controls: hazard ratios (95% CI) were 0.35 (0.14, 0.91) and 0.72 (0.52, 0.99), respectively.
- Compared to controls, patients who initiated dialysis having received predialysis care from an NPS physician had greater use of PD at dialysis initiation and through dialysis day 90 (Figure 2) and greater use of permanent vascular access (AVF or AVG) among ICHD patients at dialysis day 90 (Figure 3).

Limitations

- Despite use of matching to promote fair comparisons, differences between groups may remain.
- The extent and nature of predialysis care received by control patients is unknown.
- The number of NPS patients available for analysis was comparatively small.

Figure 2. Dialysis Modality

	Control	NPS
Day 0 modality, n (%)	*n = 263*	*n = 263*
PD	22 (8.4)	41 (15.6)
HD	241 (91.6)	222 (84.4)
Day 90 modality, n (%)	*n = 210*	*n = 244*
PD	25 (11.9)	46 (18.9)
HD	185 (88.1)	198 (81.2)
Day 180 modality, n (%)	*n = 188*	*n = 241*
PD	34 (18.1)	49 (20.3)
HD	154 (81.9)	192 (79.7)
Day 270 modality, n (%)	*n = 263*	*n = 208*
PD	28 (16.8)	38 (18.3)
HD	139 (83.2)	170 (81.7)

Abbreviations: HD, hemodialysis; NPS, Nephrology Practice Solutions; PD, peritoneal dialysis

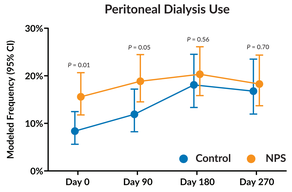
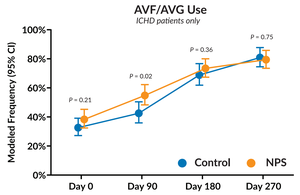


Figure 3. Dialysis Access (ICHD Patients)

	Control	NPS
Day 0 access, n (%)	*n = 239*	*n = 222*
AVF/AVG	78 (32.6)	85 (38.3)
CVC	161 (67.4)	137 (61.7)
Day 90 access, n (%)	*n = 181*	*n = 197*
AVF/AVG	77 (42.5)	108 (54.8)
CVC	104 (57.5)	89 (45.2)
Day 180 access, n (%)	*n = 151*	*n = 188*
AVF/AVG	104 (68.9)	138 (73.4)
CVC	47 (31.1)	50 (26.6)
Day 270 access, n (%)	*n = 136*	*n = 165*
AVF/AVG	110 (80.9)	131 (79.4)
CVC	26 (19.1)	34 (20.6)

Abbreviations: AVF, arteriovenous fistula; AVG, arteriovenous graft; CVC, central venous catheter; ICHD, in-center hemodialysis; NPS, Nephrology Practice Solutions



Conclusion

- These findings suggest that use of a structured process to manage the transition to dialysis for patients with CKD may be associated with improved outcomes.

Acknowledgments

We extend our sincere appreciation to the DaVita teammates who work every day to take care of patients and also to ensure the extensive data collection on which our work is based.

Correspondence: scott.sibbel@davita.com

Poster available at www.davitaclinicalresearch.com

National Kidney Foundation Spring Clinical Meetings, March 25-29, 2020.

© 2020 DaVita Inc. All rights reserved. Proprietary. May not be copied, reprinted, or distributed without the permission of DaVita Inc.