Description and Outcomes of an Innovative Concurrent Hospice-Dialysis Program

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ABSTRACT

Background Compared with the general Medicare population, patients with ESKD have worse quality metrics for end-of-life care, including a higher percentage experiencing hospitalizations and in-hospital deaths and a lower percentage referred to hospice. We developed a Concurrent Hospice and Dialysis Program in which patients may receive palliative dialysis alongside hospice services. The Program aims to improve access to quality end-of-life care and, ultimately, improve the experiences of patients, caregivers, and clinicians.

Objectives We sought to describe (1) the Program and (2) enrollment and utilization characteristics of Program participants.

Methods We conducted a quantitative description of demographics, patient characteristics, and utilization of Program enrollees.

Results Of 43 total enrollees, 44% received at least one dialysis treatment, whereas 56% received no dialysis. The median (range) hospice length of stay was 9 (1–76) days for all participants and 13 (4–76) days for those who received at least one dialysis treatment. The average number of dialysis treatments was 3.5 (range 1–9) for hemodialysis and 19.2 (range 3–65) for peritoneal dialysis. Sixty-five percent of enrollees died at home, 23% in inpatient hospice, and 12% in a nursing facility; no patients died in the hospital.

Conclusions Our 3-year experience with the Program demonstrated that enrollees had a longer median hospice stay than the previously reported 5-day median for patients with ESKD. Most patients received no further dialysis treatments despite the option to continue dialysis. Our experience provides evidence to support future work testing the effectiveness of such clinical programs to improve patient and utilization outcomes.

Nearly half a million Americans have ESKD treated with dialysis.1 When comparing outcomes in the general Medicare population, patients on dialysis approaching the end of life are approximately half as likely to receive hospice services than patients with other terminal diagnoses.2 This discrepancy reflects a poorer end-of-life experience for many patients with ESKD, because hospice positively affects care at the end of life by providing symptom management and psychologic, spiritual, and anticipatory grief support.3–7 Patients on dialysis often receive hospice services at the very end of life, with nearly half receiving hospice for ≤3 days.2 In general, patients receiving dialysis are often hospitalized near the end of life, with many dying in the intensive care unit.8

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The gap in care delivery for people with ESKD probably results, at least in part, from the structure of the Medicare hospice benefit (MHB): to receive hospice services, the MHB requires discontinuation of treatments intended to cure or reverse the admitting hospice diagnosis.\(^9,10\) For those patients who have been determined to be eligible for the MHB, the hospice agency is expected to cover all treatments related to the terminal prognosis that are palliative (i.e., noncurative) in nature. Patients may continue to receive treatments for other conditions unrelated to their terminal prognosis that could be covered outside of the MHB. Recently, the Centers for Medicare and Medicaid Services has expanded its definition of what is considered “related” to the hospice diagnosis.\(^11,12\) This has led to less willingness of hospices to incur the potential financial risk associated with covering dialysis with hospice. In this way, the MHB creates a barrier for patients on dialysis who are terminally ill with a kidney-related diagnosis and whose goals for the end of life align with hospice care but who are not ready to stop dialysis, knowing that it will usually result in death within days.\(^2,7,13\)

Therefore, improving hospice utilization for patients with ESKD requires innovation in care delivery. One strategy involves conceptualizing dialysis as part of care near the end of life. Palliative dialysis has been described as “a transition from a conventional disease-oriented focus on dialysis as rehabilitative treatment to an approach prioritizing comfort and alignment with patient preferences and goals of care to improve quality of life and reduce symptom burden for maintenance dialysis patients in their final year of life.”\(^14\) Viewed through this shifted reference frame, dialysis may enhance rather than deter the care management of patients with ESKD near the end of life.

We created a Concurrent Hospice and Dialysis Program (“the Program”) that incorporates palliative dialysis to address the gap in hospice access for patients with ESKD through proof of concept and preliminary evaluation. The Program is a collaborative care program developed through a partnership between the nonprofit dialysis organization Dialysis Clinic Inc. (DCI-REACH) and University of Pittsburgh Medical Center (UPMC) Family Hospice in Pittsburgh, Pennsylvania. The Program allows qualifying patients to continue dialysis treatments while receiving hospice services near the end of life. In this study, we sought to describe (1) the Program and (2) enrollment and utilization characteristics of patients in the Program.

**METHODS**

In this study, we conducted a retrospective chart review to generate a quantitative description of all enrollees in the Program at UPMC (Pittsburgh, PA).

**Significance Statement**

Patients with ESKD access hospice care only about half as often as patients in the general Medicare population. A novel Concurrent Hospice and Dialysis Program aims to improve hospice access for patients with ESKD by offering palliative dialysis concurrently with hospice care. This paper describes the structure of the Program and presents a quantitative description of enrollees. Our 3-year experience with the Program demonstrated that patients had a median hospice length of stay longer than that found in previous reports and provides evidence to support future work to test the effectiveness of such clinical programs.

**Program Setting**

The Program is a collaboration between DCI-REACH and UPMC Family Hospice aimed to promote timely hospice services for patients on dialysis near the end of life. DCI-REACH is a nonprofit kidney health provider serving >16,000 patients in 30 states. UPMC Family Hospice is a nonprofit hospice organization with multiple locations throughout Pennsylvania. They currently operate two inpatient hospice units and care for an approximate average daily census of 700 patients. UPMC Family Hospice West, which operates out of Pittsburgh, contracted fixed rates with DCI-REACH for both hemodialysis and peritoneal dialysis to support the Program. Therein, UPMC Family Hospice incurs the cost of dialysis at the agreed-upon contracted rate with DCI-REACH. The contracted fixed rates were calculated on the basis of the average Medicare payment for each modality. For hemodialysis, this contracted rate was for each hemodialysis treatment provided. For peritoneal dialysis, the contracted rate was determined on the basis of a monthly supply of peritoneal bags and supplies.

The Program was developed for patients with ESKD receiving dialysis at a DCI-REACH clinic within a geographic location served by UPMC Family Hospice. A Family Hospice nurse champion (senior clinical manager, Family Hospice operations) was identified as the contact person to address program-related questions, schedule hospice informational sessions with potential participants, and assist with admissions to the Program. Order sets for concurrent care and communication tools were created to systematize the workflow and care coordination between the dialysis and hospice teams. The details of the program structure and components are listed in Figure 1. The Program structure and components were iteratively informed by informal feedback elicited from clinicians and families who were involved in the Program.

**Program Overview**

**Patient Identification**

All of the patients eligible for the Program had ESKD that was determined to be related to their terminal prognosis by
The Program is offered during clinical goals-of-care conversations for patients whose goals align with comfort-based care as follows: (1) an estimated prognosis of 2 months on the basis of clinical judgment (including functional or medical decline, recurrent hospitalizations) or prompting from patients or caregivers and (2) a desire to continue dialysis for a limited time. The 2-month prognostic horizon provides guidance to support transitions into hospice while being mindful of the limited number of dialysis treatments the hospice can make available (up to ten hemodialysis treatments or 30 days of peritoneal dialysis treatments). Patients and caregivers who express interest in the program meet with a hospice liaison to discuss the Program and ensure it aligns with their goals of care. If goals of care align, a referral for the Program is placed, and palliative dialysis and hospice services are initiated.

Palliative Dialysis
Once a patient enrolls in the program, the dialysis team evaluates the patient’s current dialysis prescription and revises it on the basis of a palliative dialysis order set (Supplemental Appendices 1 and 2). Within each palliative dialysis order set, the team individualizes the treatment plan to ensure it is patient centered. This often includes consideration of both the clinical and patient goal information. For instance, many patients will opt for decreasing the frequency in number of treatments and/or time of treatment so they may optimize time at home with family. Because the prognosis for patients who join the Program is limited to days or weeks, routine blood draws and kidney medications for anemia and bone disease that do not address comfort are stopped. The order set contains guidance to decrease treatment frequency, duration, and fluid removal; discontinuation of unnecessary laboratory tests and medications not addressing comfort and symptoms; liberalization of dietary restrictions; and parameters to guide when to defer or stop dialysis. These parameters include hemodynamic guidance and clinical signs that would suggest to the hospice and dialysis clinicians that prognosis is likely hours to days.

Hospice Services
Hospice services, as provided through the MHB, are also initiated. In addition to the usual hospice-related costs and the contracted rate for dialysis treatments, the hospice also covers transportation to and from the dialysis clinic. Patients can receive hospice services at home, in a nursing home, or in an inpatient hospice unit setting if symptoms warrant more intensive management.

Care Coordination
All participating DCI-REACH social workers attended monthly webinars addressing education and skills related to hospice, identifying patients who may benefit from the Program, and caring for patients on dialysis near end of life. Upon enrollment in the Program, the dialysis team completes the Concurrent Order Sheet, including guidance for

Figure 1. Overview of the program. The Program structure and components utilized by the dialysis and hospice teams caring for patients on dialysis who may benefit from concurrent care.
palliative dialysis. This form is faxed or emailed to Family Hospice for distribution to the team caring for the patient. The care plan is revisited weekly, with frequent communication between hospice and dialysis teams through email, phone, and in-person discussion. Care coordination between the hospice team and the patient and family occurs as per usual hospice care. After the patient’s last dialysis session, the dialysis team completes a Communication Tool that summarizes the dialysis treatment information and care coordination feedback (Supplemental Appendix 3). This tool is faxed or emailed to UPMC Family Hospice and is used to learn more about the team’s experience caring for each patient.

Program Participants and Eligibility
Participants eligible for the Program include patients receiving dialysis at any of the 19 DCI outpatient dialysis clinics in western Pennsylvania serviced by Family Hospice. The Program setting included five urban academic and community UPMC hospitals, each with an inpatient palliative care team (UPMC Presbyterian, UPMC Shadyside, UPMC Magee Women’s and Children’s, UPMC St. Margaret’s, and UPMC Mercy), and one UPMC academic outpatient kidney palliative care clinic staffed by two dual-trained nephrology and palliative care physicians (including J.O.S.). A brochure about the Program, including contact information for the referral process, was created and circulated to the 19 DCI outpatient dialysis clinics, each patient palliative care team, and the outpatient kidney palliative care clinic. In addition, the Program physician champion (J.O.S.) periodically met with the care teams to describe the Program and address questions.

The Program was only offered to patients (1) who expressed a wish to continue dialysis alongside hospice services, and (2) whose ESKD was related to their hospice diagnosis. The Program initially developed for patients receiving in-center hemodialysis; however, the program was later expanded to include patients receiving peritoneal dialysis at home.

Participants are referred to the Program from three potential sources: an inpatient palliative care clinician, outpatient dialysis clinician, or other outpatient clinician (such as primary care or subspecialty physician). These sources reflect the referral setting in which the patient and/or caregiver participated in a goals-of-care discussion that included the Program (i.e., hospital admission, outpatient dialysis clinic, or outpatient clinic visit). The Program was designed to assist with goals-of-care discussions. For instance, an outpatient dialysis team may identify a patient and seek assistance from the outpatient palliative or the hospice team to engage in the goals-of-care conversation. Once identified as a potential Program participant, the Family Hospice nurse champion receives notification and schedules a hospice informational visit with the patient and family to describe program details.

Data Collection
We conducted a retrospective, descriptive electronic health record (EHR) review of all patients admitted to the Program between the program’s inception in January 2018 and December 15, 2021. All study procedures were approved by the institutional review board at the University of Pittsburgh. Demographic and clinical characteristics and clinical outcomes data for the quantitative evaluation of the Program were abstracted from review of selected UPMC EHR inpatient records (i.e., palliative care consults, renal consults, discharge summaries) and outpatient records (i.e., palliative care and nephrology clinic visits) by a physician in nephrology training (A.E.B.), with regular feedback and adjudication from the investigator team. Data regarding hospice date of enrollment, hospice length of stay, death location, and number of dialysis treatments was obtained from UPMC Family Hospice tracking data provided by the hospice nurse champion.

Patient Characteristics
In addition to demographic data (i.e., age, sex, race), we abstracted referral source (i.e., inpatient palliative care clinician, outpatient dialysis clinician, or other outpatient clinician, such as primary care physician or subspecialty physician), dialysis modality, and length of time on dialysis (in days) at Program enrollment (when dialysis start date was available). We also recorded the laboratory values drawn closest to enrollment (i.e., creatinine, BUN, albumin, hemoglobin, and hematocrit), from 12 months before enrollment. We abstracted comorbidities from the EHR and calculated the Charlson comorbidity index score at the time of hospice enrollment.

Decision Making
We abstracted patient involvement in hospice decision making and reason for absence of involvement, if applicable. Patient involvement in hospice decision making refers to whether patients participated in goals-of-care conversations about their care wishes. Some patients were not able to participate in these conversations due to personal preference or lack of cognitive capacity.

Outcomes
Outcomes were based on review of goals-of-care discussions in the EHR and information from hospice if none were available. Additionally, we collected information regarding hospice length of stay and number of dialysis treatments from hospice records, stratified by dialysis modality. A dialysis treatment for both hemodialysis and peritoneal dialysis was defined as 1 day in which a patient received any dialysis treatment (regardless of duration or number of exchanges). We also recorded the number of emergency department visits, number and duration of hospitalizations after hospice enrollment, and location of death.
Statistical Analysis
Demographic, clinical, and utilization characteristics of enrollees are described with univariable statistics including mean, SD, and range, using Microsoft Excel 365.

RESULTS

Descriptive Characteristics of Program Enrollees
A total of 43 patients enrolled in the Program as of December 31, 2021. Mean±SD age at enrollment was 74.1±11.2 years (range, 36–97 years). Fewer than half (44.2%) of patients were women. Thirty-two (74.4%) patients were White, ten (23.3%) were Black, and one (2.3%) was Asian. Average±SD time on dialysis at program enrollment was 1037±1020 days (range, 6–1417 days); 38 (88.4%) were receiving hemodialysis, and five (11.6%) were receiving peritoneal dialysis. Mean±SD albumin level was 2.6±0.7 g/dL. Mean±SD Charlson comorbidity index on enrollment was 8.1±3.0. Congestive heart failure was the most frequently observed comorbid condition among enrolled patients (n=31, 72.1%); other common comorbidities included chronic lung disease (n=18, 41.2%), myocardial infarction (n=17, 39.5%), cerebrovascular disease (n=17, 39.5%), peripheral vascular disease (n=16, 37.2%), and diabetes with complications (n=15, 34.9%) (Table 1).

Patients were referred to the Program most often by inpatient palliative care clinicians (n=25, 58.1%), followed by outpatient dialysis clinicians (n=17, 39.5%), and one patient was referred by a non-nephrology outpatient clinician (Table 1). Nearly two thirds of Program enrollees (n=27, 62.8%) actively participated in the decision to enroll. Of the enrollees who were not involved in decision making, seven (46.7%) were unable to participate due to acute mental status change, seven (46.7%) were unable to do so due to dementia, and one (6.7%) chose not to participate, citing personal preference (Table 2). In these instances, the medical decision maker made the decision to elect the Program.

Ten patients were referred for an informational session about the Program and subsequently decided not to enroll. Reasons for not enrolling included the following: (1) goals did not align with hospice and patient was still interested in pursuing life-prolonging treatments, (2) patient was not interested in weaning dialysis treatments, (3) patient wanted to pursue/continue skilled nursing placement, and (4) two patients were deemed too close to end of life and died before hospice could enroll. One patient who entered the Program received nine dialysis treatments and then revoked hospice due to a desire to continue dialysis. The patient subsequently resumed hospice 45 days later with no further dialysis treatments.

Program Costs
We examined the costs of care for a subset of 14 patients who received at least one dialysis treatment on the Program. Costs for three locations of hospice care—home hospice, inpatient hospice, and mixed (received both home and inpatient hospice)—were marginally higher compared with costs for general Family Hospice patients during the same time period. The main drivers of cost for patients on the Program included (1) dialysis cost (on average around $50 per day), (2) transportation cost (varied depending on the service used and the distance traveled), and (3) mixed location (patients on the Program spent more days in inpatient hospice care compared with home hospice).

Dialysis Utilization
Twenty patients (46.5%) received at least one dialysis treatment after hospice enrollment. Of the patients who

| Table 1. Demographic characteristics of program enrollees |
|-----------------------------|-----------------------------|
| Patient Characteristics (n=43) | Value                      |
| Age (yr) at enrollment, mean±SD (range) | 74.1±11.2 (36–97)          |
| Women, n (%)                     | 19 (44.2)                  |
| Race, n (%)                      |                            |
| White                            | 32 (74.4)                  |
| Black                            | 10 (23.3)                  |
| Asian                            | 1 (2.3)                    |
| Program referral source, n (%)   |                            |
| Inpatient clinician              | 25 (58.1)                  |
| Outpatient dialysis unit         | 17 (39.5)                  |
| Outpatient physician (non-nephrology) | 1 (2.3)                |
| Days on dialysis at hospice admission, mean±SD (range) | 1037±1020 (6–1417) |
| Dialysis modality before hospice admission, n (%) |                     |
| Hemodialysis                     | 38 (88.4)                  |
| Peritoneal dialysis              | 5 (11.6)                   |
| Laboratory values on enrollment, mean±SD |                   |
| BUN, mg/dL                       | 37±2                       |
| Creatinine, mg/dL                | 4.3±1.6                    |
| Albumin, g/L                     | 2.6±0.7                    |
| Hemoglobin, mg/dL                | 9.3±1.8                    |
| Hematocrit, %                    | 28.6±5.6                   |
| Charlson comorbidity index score, n (%), mean±SD | 8.1±3.0                 |
| Congestive heart failure         | 31 (72.1)                  |
| Chronic lung disease             | 18 (41.9)                  |
| Myocardial infarction            | 17 (39.5)                  |
| Cerebrovascular disease          | 17 (39.5)                  |
| Peripheral vascular disease      | 16 (37.2)                  |
| Diabetes with complications      | 15 (34.9)                  |
| Dementia                         | 12 (27.9)                  |
| Peptic ulcer disease             | 10 (23.3)                  |
| Solid tumor malignancy with metastasis | 8 (18.6)          |
| Diabetes without complications   | 5 (11.6)                   |
| Liver disease, mild              | 4 (9.3)                    |
| Connective tissue disease        | 3 (7)                      |
| Leukemia                         | 3 (7)                      |
| Lymphoma                         | 1 (2.3)                    |
| Liver disease, severe            | 0                          |
| Paralysis or hemiparesis         | 0                          |
| AIDS                             | 0                          |
received at least one dialysis treatment after enrollment, 15 (75.0%) received hemodialysis and five (25.0%) received peritoneal dialysis. The patients receiving hemodialysis received an average±SD of 3.5±2.8 (range, 1–9) dialysis treatments after enrollment, whereas the patients receiving peritoneal dialysis received an average±SD of 19.2±26.3 (range, 3–65) treatments (Table 3).

**Hospice and End-of-Life Outcomes**

After Program enrollment, two patients had at least one hospitalization/emergency department visit while on the Program, and the mean length of stay for hospitalizations was 1.5 days (range, 1–2 days; Table 2). No patients were admitted to the intensive care unit after starting the Program.

The median (range) hospice length of stay among patients involved in the Program was 9.0 (1–76) days (Table 2). Among the 20 patients who received at least one dialysis treatment after enrollment, the median (range) length of stay was 13.0 (4–76) days (Table 2). Patients receiving hemodialysis had a median (range) length of stay of 13.0 (5–36) days, whereas the median (range) length of stay for patients receiving peritoneal dialysis was 9.0 (4–76) days (Table 2). Among the 20 patients who did not receive dialysis after enrollment (all hemodialysis modalities), median (range) length of stay was 6.0 (1–17) days. Nearly two thirds (n=28, 65.2%) of enrolled patients died at home, whereas ten (23.3%) died in an inpatient hospice unit and five (11.6%) died in a skilled nursing facility. None of the patients died in a hospital setting (Table 2).

### DISCUSSION

**What We Learned**

In an innovative Concurrent Hospice and Dialysis Program that has enrolled 43 participants, fewer than half of the patients received any dialysis treatments. Among those who did receive dialysis, patients received an average (range) of 3.5 (1–9) treatments, lower than the ten predesignated by program enrollment criteria. Even still, the median hospice length of stay for Program patients was longer than the previously reported median of 5 days for patients with ESKD. Of note, no enrollees died in the hospital.

Currently, most patients on dialysis experience intensive care near the end of life. Only a quarter receive hospice services; even then, short lengths of stay may limit the benefits of hospice, including psychologic and spiritual support. Providing treatments that focus on quality of life and reduction of symptom burden alongside hospice services may positively affect end-of-life outcomes and overall cost of care.

According to previous work examining dialysis and hospice, patients allowed to continue dialysis are more likely to benefit from the intended hospice services, which support symptom management and psychologic and spiritual well-being. Similarly, in the Veterans Affairs system, bereaved family caregivers of patients who received concurrent hospice and dialysis tended to rate the quality of end-of-life care higher than for those who received hospice and stopped dialysis. Providing disease-directed treatments, such as palliative dialysis, alongside hospice services may positively affect end-of-life outcomes. One study in the Veterans Affairs system examined the effect of a concurrent model of cancer

### Table 2. Hospice utilization outcomes associated with the program

<table>
<thead>
<tr>
<th>Utilization (n=43)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital encounters during hospice enrollment (aggregate among all patients)</td>
<td></td>
</tr>
<tr>
<td>Emergency department visits</td>
<td>2</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>2</td>
</tr>
<tr>
<td>Days hospitalized (among hospitalized patients), mean (range)</td>
<td>1.5 (1–2)</td>
</tr>
<tr>
<td>Patient involvement in hospice decision making, n (%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27 (62.8)</td>
</tr>
<tr>
<td>No</td>
<td>15 (34.9)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (2.33)</td>
</tr>
<tr>
<td>Reason patient not involved, n (%)</td>
<td></td>
</tr>
<tr>
<td>Acute mental status change/delirium</td>
<td>7 (46.7)</td>
</tr>
<tr>
<td>Dementia</td>
<td>7 (46.7)</td>
</tr>
<tr>
<td>Patient preference</td>
<td>1 (6.7)</td>
</tr>
<tr>
<td>Hospice length of stay (d), median (range)</td>
<td></td>
</tr>
<tr>
<td>Among patients who received one or more dialysis treatment after hospice enrollment</td>
<td></td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>13.0 (5–36)</td>
</tr>
<tr>
<td>Peritoneal dialysis</td>
<td>9.0 (4–76)</td>
</tr>
<tr>
<td>Among patients receiving no dialysis after hospice enrollment</td>
<td></td>
</tr>
<tr>
<td>Prior hemodialysis</td>
<td>6.0 (1–17)</td>
</tr>
<tr>
<td>Prior peritoneal dialysis</td>
<td>0</td>
</tr>
<tr>
<td>Location of death, n (%)</td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>28 (65.1)</td>
</tr>
<tr>
<td>Inpatient hospice</td>
<td>10 (23.2)</td>
</tr>
<tr>
<td>Skilled nursing facility</td>
<td>5 (11.6)</td>
</tr>
<tr>
<td>Hospital</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 3. Dialysis utilization outcomes associated with the program

<table>
<thead>
<tr>
<th>Utilization (n=43)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients who received one or more dialysis treatment after hospice enrollment, n (%)</td>
<td>20 (46.5)</td>
</tr>
<tr>
<td>Dialysis modality of patients who received one or more treatment, n (%)</td>
<td></td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>15 (75.0)</td>
</tr>
<tr>
<td>Peritoneal dialysis</td>
<td>5 (25.0)</td>
</tr>
<tr>
<td>Dialysis treatments received during hospice enrollment, all patients, mean±SD (range)</td>
<td></td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>3.5±2.8 (1–9)</td>
</tr>
<tr>
<td>Peritoneal dialysis</td>
<td>19.2±26.3 (3–65)</td>
</tr>
</tbody>
</table>
therapy alongside hospice services for veterans with newly diagnosed stage 4 lung cancer, in which concurrent hospice was associated with less aggressive medical treatment and lower costs, despite ongoing cancer treatment.18

Our experience with the Program provides a proof of concept, and also generates more questions to explore. Patients enrolled in the Program experienced very few hospital visits and intensity of care at the end of life. This experience is similar to published data that patients on dialysis with longer hospice lengths of stay have less intensive care at end of life. However, additional research is necessary to establish causal relationships between the Program and reductions in utilization of intensive treatments, and to examine how reduced utilization affects overall care costs compared with patients who do not participate in the Program.

Although the Program was designed to provide patients with up to ten palliative dialysis treatments after hospice enrollment, only half received any dialysis treatments, and among the half of patients who did receive dialysis, patients sought an average of only 3.5 treatments before discontinuing dialysis and transitioning exclusively to hospice care. These results raise questions about the reasons why patients and families may choose a concurrent model of care instead of traditional hospice, especially when no dialysis treatments are ultimately elected, and about the actual financial implications of providing dialysis treatments for patients during their hospice stay.

In the United States, policymakers are testing kidney care payment models that work toward the shared goals of providing high-quality care while reducing costs. Beginning in January 2021, the Center for Medicare and Medicaid Innovation (CMMI) included a provision for hospice services in the Medicare Advantage Value-Based Insurance Design Demonstration. As a part of this model, "delivery of transitional concurrent care" is a quality indicator and hemodialysis is one of several examples referenced by CMMI in the program detail.19

The Kidney Care Choices (KCC) model presents another opportunity to provide concurrent hospice and dialysis care. The 5-year model, delayed until January 1, 2022 due to the coronavirus disease 2019 pandemic, uses innovative waivers and payment options to incentivize providers to better manage care for Medicare beneficiaries with CKD and ESKD. Designed to reduce the cost and improve the quality of care for patients living with CKD and ESKD, all of the KCC model components include a benefit enhancement for concurrent dialysis and hospice, waiving the usual requirement that beneficiaries decline disease-directed therapy to receive hospice services.20 These models may improve hospice utilization and provide opportunities to test innovative approaches to hospice and dialysis care.

The Program addresses reported unmet palliative care needs and barriers to better end-of-life care in dialysis.21 First, dialysis team members underwent education sessions on basic palliative care skills, including identifying patients who are seriously ill, goals-of-care conversations, and end-of-life care. Second, dialysis team members could request assistance from the outpatient palliative care and/or the hospice team to assist with goals-of-care conversations when needed. Ultimately, 40% of referrals were initiated within the dialysis clinic by dialysis team members, which may suggest improved skills and comfort in discussing the Program with patients and families.

Limitations

This study had several limitations. The Program was only implemented in a single academic medical center with a large hospice affiliation; although the cost of this program proved financially feasible, additional administrative barriers may exist when expanding to smaller or more rural hospices.22 This work is purely descriptive; additional pragmatic research is required to determine causal effects of concurrent hospice and dialysis care on end-of-life quality and utilization outcomes. We were also unable to report details about how often patients or families initiated inquiries about the Program (as opposed to those who were referred into the Program by clinicians); the frequency and content of hospice visits, communication, and care coordination activities; or specific information about financial outcomes for these patients.

Additionally, the <2 months prognostic guideline is both restrictive and difficult given the limitations in prognostic tools. This criterion was chosen for this pilot project due to financial feasibility and to create an argument more likely to be accepted for policy changes. Ideally, a program like this would be offered to patients with a longer prognosis (e.g., 6 months).

Next Steps

Future work related to the Program will include qualitative analyses to assess the experience of the Program for patients, caregivers, clinicians, and administrators in dialysis and hospice. Additionally, a community advisory panel will convene in quarterly meetings to guide educational and implementation materials for an intervention package for concurrent hospice-dialysis care that can be tested via a pragmatic clinical trial.

Our 3-year experience with the Program demonstrated that patients had a median hospice length of stay longer than the previously reported 5-day median. Most patients received no further dialysis treatments despite the option of continuing palliative dialysis. Our findings provide evidence that supports the development of innovative care models for patients with ESKD approaching the end of life. Future work will test the effectiveness of such clinical programs to improve patient and utilization outcomes.
DISCLOSURES

K. Lagnese reports being employed by Prospero Health, and serving as chief medical officer of UPMC Family Hospice during the study period. J.O. Schell reports receiving salary support as a palliative care advisor for Dialysis Clinic Inc., research funding from Palliative Care Research Collaborative, and honoraria from UpToDate. R. Taylor reports having an advisory or leadership role with Alive Hospice, being employed by DCI, and serving as the senior medical director of Reach Kidney Care. All remaining authors have nothing to disclose.

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AUTHOR CONTRIBUTIONS

A.E. Bursic was responsible for data curation; A.E. Bursic and N.C. Ernceoff were responsible for formal analysis and methodology; A.E. Bursic, N.C. Ernceoff, and J. Schell wrote the original draft; N.C. Ernceoff, K. Laginese, E.M. Motter, and J.O. Schell reviewed and edited the manuscript; N.C. Ernceoff, K. Laginese, J.O. Schell, and R. Taylor conceptualized the study and provided supervision; N.C. Ernceoff, E.M. Motter, and J.O. Schell were responsible for project administration; K. Laginese, J.O. Schell, and R. Taylor were responsible for resources; and J.O. Schell was responsible for funding acquisition.

DATA SHARING STATEMENT

Data used in this paper cannot be shared because the data include protected health information. We abstracted protected health information, with stopping dialysis treatment and receipt of hospice services. JAMA Intern Med 176: 1099–1102, 2016


A. E. Bursic and N.C. Ernceoff were responsible for formal analysis and methodology; A.E. Bursic, N.C. Ernceoff, and J. Schell wrote the original draft; N.C. Ernceoff, K. Laginese, E.M. Motter, and J.O. Schell reviewed and edited the manuscript; N.C. Ernceoff, K. Laginese, J.O. Schell, and R. Taylor conceptualized the study and provided supervision; N.C. Ernceoff, E.M. Motter, and J.O. Schell were responsible for project administration; K. Laginese, J.O. Schell, and R. Taylor were responsible for resources; and J.O. Schell was responsible for funding acquisition.

DATA SHARING STATEMENT

Data used in this paper cannot be shared because the data include protected health information. We abstracted protected health information, including dates of encounters.

SUPPLEMENTAL MATERIAL

This article contains the following supplemental material online at http://jasn.asnjournals.org/lookup/suppl/doi:10.1681/ASN.2022010064/-/DCSupplemental.

Supplemental Appendix 1. Hemodialysis order set.
Supplemental Appendix 2. Peritoneal dialysis order set.
Supplemental Appendix 3. Communication tool.

REFERENCES


AFFILIATIONS

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3Division of General Internal Medicine, Section of Palliative Care and Medical Ethics, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania
4Prospero Health, Memphis, Tennessee
5Dialysis Clinic, Inc., Nashville, Tennessee
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ESRD Concurrent Hospice Dialysis Program:  
Hemodialysis Order Sheet

*This form should be completed by the nephrologist and faxed to Hospice team at: _______________

1. Patient information (Name, DOB, Clinic Location):
   ________________________________________________________________

2. ESRD Concurrent Care: Hospice Dialysis Program Checklist:
   ☐ Nephrology attending notified: Name and Contact Information:
   ________________________________________________________________
   ☐ Hospice referral placed (contact information)
   ☐ Hospice plan of care and medications received
   ☐ Code status/advance directive updated (reflects goals that focus on comfort)
   ☐ Surrogate Decision maker identified
   Enter Name and Contact information:
   ________________________________________________________________

3. Communication:
   a. Contact name and phone number for dialysis nurse manager:
      ________________________________________________________________
   b. Contact name and phone number of hospice team nurse:
      ________________________________________________________________
   c. Family Hospice contact information if hospice team nurse cannot be reached:
      ________________________________________________________________

4. Palliative Dialysis prescription per patient goals of care.
   To achieve goals of comfort while undergoing dialysis, please consider the following parameters:
   • Number of treatments per week depending on dialysis clinic availability: Consider decreasing to 2 per week based on patient goals and clinical status
   • Treatment time: Consider shortening dialysis time to optimize quality of life
   • Ultrafiltration goal: Recommend conservative goals, either increasing EDW to minimize large UF or discussing goal on a treatment-by-treatment basis.

   Adjustments to dialysis prescription (write NA if no changes are made from previous prescription):
   1. Number of treatments per week ______
   2. Time __________________________
   3. Ultrafiltration goal __________________________
   4. K bath __________________________
5. De-prescribe medications per patient goals of care (dialysis-specific medications).
   - Notify Harold Manley of MTM consult (contact: 518-928-4487)
   - Discontinue ESA
   - Discontinue Phosphate binders
   - Discontinue vitamin D analogues or calcimimetics
   - Discontinue all meds that do not address comfort

6. Liberalize Diet per patient goals of care
   - Discontinue renal diet
   - Discontinue fluid restriction
   - Normal, non-restricted diet

7. Discontinue Lab Draws per patient goals of care
   - Discontinue all lab draws
   - Continue lab draws as requested by patient and physician

8. Guidance for when to hold or recommend stopping dialysis:
   - Patient or family request not to do dialysis
   - Patient appears clinically unstable (blood pressures very low, concern for mental status, or showing signs of dying)
   - If patient appears unstable, call nephrologist and hospice team

9. Re-assess plan of care
   - Performed weekly by the hospice team
   - Weekly meeting between hospice and dialysis team to discuss patient care plan
   - Notify primary care nephrologist if patient wishes to stop dialysis and confirm agreement
   - Notify primary care nephrologist if patient wishes to come off the Concurrent Program and return to routine dialysis
ESRD Concurrent Hospice Dialysis Program: Peritoneal Dialysis Order Sheet

*This form should be completed by the nephrologist and faxed to Hospice team at: _______________

10. Patient information (Name, DOB, Clinic Location):
   ____________________________________________

11. ESRD Concurrent Care: Hospice Dialysis Program Checklist:
    ☐ Nephrology attending notified: Name and Contact Information:
        ______________________________________
    ☐ Hospice referral placed (contact information)
    ☐ Hospice plan of care and medications received
    ☐ Code status/advance directive updated (reflects goals that focus on comfort)
    ☐ Surrogate Decision maker identified
    Enter Name and Contact information:
        _________________________________________________________________

12. Communication:
    a. Contact name and phone number for home dialysis nurse:
        __________________________________________
    b. Dialysis contact information if home dialysis nurse cannot be reached:
        __________________________________________
    c. Contact name and phone number of hospice team nurse:
        __________________________________________
    d. Family Hospice contact information if hospice team nurse cannot be reached:
        __________________________________________
    e. Technical PD vendor support contact information:
        __________________________________________

13. PD Specific considerations:
    a. Date of last monthly delivery:
    b. Date of next monthly delivery:
    c. Current supply inventory:
        __________________________________________

14. Palliative Peritoneal Dialysis prescription per patient goals of care.
    To achieve goals of comfort while undergoing dialysis, please consider the following parameters:
    • Number of exchanges per day based on clinical condition: We recommend adjusting the current prescription to every other day (two week supply would then last a month). The
other option would be halving the current prescription (i.e., changing 4 exchanges/day to 2 exchanges/day). This would also mean a two week supply would last a month.
  o Keep in mind additional changes may be necessary as clinical status will change closer to end of life and so dialysis prescription should be adjusted

**Treatment time:** Adjust time in consideration of the changes made in number of exchanges per day (for instance, if typical treatment time is 8 hours for 4 exchanges, the new time would be 4 hours for 2 exchanges)

**Glucose concentration:** Recommend conservative ultrafiltration goals, either increasing EDW to minimize large fluid removal or discussing fluid removal goal on a treatment-by-treatment basis. Consider using 1.5% bags and reserving higher glucose concentration for as needed basis.

**Fill volume:** Recommend lowering fill volume if necessary to maximize comfort. Consider changing to a script on cycler machine that would require one bag of six liters. This will cut down on supplies needed

Adjustments to dialysis prescription (write NA if no changes are made from previous prescription):

8. Number of treatments per week _______
9. Number of exchanges per day _______
10. Type of therapy (APD or CAPD)
11. Therapy time ___________________________
12. Adjust glucose concentration to maintain ~ EDW: _____________
13. Fill volume:
14. Other orders: _____________________

15. **PD emergencies** (Dialysis nurse should be contacted for all PD emergencies):
  1. **Peritonitis:** If a patient experiences signs and symptoms of peritonitis (cloudy fluid, abdominal pain, fever/systemic symptoms):
     a. Empirically treat for peritonitis (symptom management is key at EOL)
     b. Standard treatment for two weeks:
        i. Vancomycin weight-based intraperitoneal (IP)
        ii. Ciprofloxacin 400mg daily (if patient tolerating PO)
        iii. If patient is not taking in PO, discuss with hospice team about reassessing goals of care and whether end of life management appropriate
     c. If symptoms not resolving with empiric treatment, reach out to hospice team to discuss plan of care and whether further investigation necessary versus focusing on end of life care
  2. **Catheter contamination:**
     a. Notify the dialysis nurse to identify treatment plan
     b. Give one dose of vanco IP and cefipime IP vs gentamycin IP
  3. **Drainage issues:** Common with patients who are on opiates
a. Check for constipation and reach out to hospice to address management plan

16. **De-prescribe medications per patient goals of care** (dialysis-specific medications).

☐ Notify Harold Manley of MTM consult (contact: 518-928-4487)
☐ Discontinue ESA
☐ Discontinue Phosphate binders
☐ Discontinue vitamin D analogues or calcimimetics
☐ Discontinue all meds that do not address comfort

17. **Liberalize Diet per patient goals of care**

☐ Discontinue renal diet
☐ Discontinue fluid restriction
☐ Normal, non-restricted diet

18. **Discontinue Lab Draws per patient goals of care**

☐ Discontinue all lab draws
☐ Continue lab draws as requested by patient and physician

19. **Guidance for when to hold or recommend stopping dialysis:**

☐ Patient or family request not to do dialysis
☐ Patient appears clinically unstable (blood pressures very low, concern for mental status, or showing signs of dying)
☐ If patient appears unstable, call nephrologist and hospice team

20. **Re-assess plan of care**

☐ Performed weekly by the hospice team
☐ Weekly meeting between hospice and dialysis team to discuss patient care plan
☐ Notify primary care nephrologist if patient wishes to stop dialysis and confirm agreement
☐ Notify primary care nephrologist if patient wishes to come off the Concurrent Program and return to routine dialysis
ESRD Concurrent Program: Communication Tool

Demographic information:

1. Who is completing this form (name/role):
2. Patient name/DOB:
3. DCI unit:
4. Primary nephrologist:

Palliative dialysis information:

5. How many treatments did patient receive after hospice initiated?: ____
6. Was the dialysis prescription modified once the patient started dialysis? (yes/no)
7. Was dialysis ever not given due to patient instability (blood pressures very low, concern for mental status, or showing signs of dying)? (yes/no)
8. How many treatments ordered per week (ex: 2/week or 1/week): ____
9. How much time (in minutes) was treatment decreased? (ex: decrease in X min): ____
10. How was the ultrafiltration goal modified? (ex: increased weight to X, lowered UF goal to X): ____

Deprescribing medications per patient goals:

11. Was Harold Manley from DCI pharmacy notified? (yes/no)
12. Please check whether the following medication categories were stopped or not ordered:
   a. ESA agents: ____
   b. Phosphate binders: ____
   c. Vitamin D analogues or calcimimetics: ____

Discontinuation of lab draws:

13. Were routine labs discontinued after hospice initiated? (if not, why)
**Communication with the hospice team:**

14. Did the dialysis team contact the hospice team with any questions or concerns? If yes please indicate the reason and what happened:

15. Any feedback for the hospice team that would have helped you better care for this patient?

**Reflections from the dialysis team/patient/family:**

16. We appreciate learning about the experience of caring for patients in this program. Please provide any reflections that stood out to you or the dialysis team.

Thank you for completing this form. Please fax completed form to Jenna Graham from Family Hospice at Fax: 412-572-8492